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ORIGINAL ARTICLES

A CASE OF THIRST.

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A typical aguaje (i. e., "water") of southwestern Arizona has been known since the days of Padre Kino (who apparently passed that way in the expedition of 1701 which proved that California is not an island) as Tinajas Altas or "high tanks" certainly the place was first located for white men on the Kino map of 1702 as Tinaxa. The water is found in a number of potholes or water-pockets in a gorge deeply cleaving the northeastern side of Sierra Gila; it is chiefly a residuum of the light midsummer or midwinter rains, though the deeper basins are partly supplied by seepage from the granite ledges and precipices rising in rugged masses on both sides of the gorge. The locality is about 75 miles southeast of Yuma, some 40 miles south of Gila River, and three or four miles north of the Mexican boundary at a point 50 miles east of the mouth of Rio Colorado. The nearest house—the Southern Pacific station at Wellton— is some 30 miles northward in an air line over broad sandwastes with scattered buttes and ranges; water is obtainable at the Fortuna mine, 35 miles northwestward in Sierra Gila, and sometimes in other waterholes in the granites seven miles southward and twenty miles eastward; the abandoned Tule Well is 23 miles eastward; and the nearest certain water in that direction is in Rio Sonoyta at Agua Salada, some 80 miles away. The region was never permanently inhabited by the aborigines, though temporarily occupied by the Papago Indians at the times of the cactus-fruit harvests, and apparently by the Cocopa and Maricopa Indians as a way-station on a severe and secret route of intercommunication; and hundreds of mortars are ground into the granites about the tinajas, while other relics occur. For the two half-centuries (1750-1848) during which California was a flourishing Mexican province, Tinajas Altas was reputed the sole sure "water" between Rio Sonoyta at Quitobaquito and Rio Colorado at Yuma on that desperately hard trail known as El Camino del Diablo,

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joining the royal roads of Sonora and more southerly states with El Camino Real, along which the old missions of southern California were strung; during the days of the Argonauts, from '49 to the middle '50s, the same route was the hardest part of the old Yuma Trail trod by American Pioneers on their way to the land of gold. From the single-house settlement of Quitobaquito to the town of Yuma the trail is houseless, and apparently never had a permanent habitation save a small adobe at Tule Well; yet the passage of pioneers over the desert wastes of the trail was so steady and long-continued that hardly a mile of the 200 from Santo Domingo to Yuma remains unmarked by one or more cruciform stone-heaps, each telling its tale of death by the wayside; death commonly in its cruelest form—by the torture of thirst. Most of the movement was westward, and the worst stretch lay between Tule Well and Tinajas Altas; along this way the cross-shapen stone heaps, each telling mutely of ghastly tragedy, thicken until within gunshot of the nearly perennial water there are over 60 marked graves—and how many unmarked none know; for again and again exhausted strugglers fell at the foot of the gentler slope or failed to find water in the lowest tank and were unable to climb the rocks to the higher reservoirs: when if the next followers were pious folk—as were most of the Mexican pioneers—the stark bodies were laid in shallow graves, laboriously sealed with the sign of the cross.

Such was the site of my camp from May 20 to August 28, 1905,—a tentless camp, with a living population of one when Papago Jose was gone for a week or less at a time, of two when either he or the young histrion Harrison Ford was present, and three with both; or of half a dozen for a few hours at a time when, as happened twice or thrice, prospecting parties passed that way: a camp devoted to meteorologic observation and study of the effects of light on desert life.

Just before noon Monday, August 14, Pablo Valencia and Jesus Rios drifted into camp horseback enroute to the "lost mines" rediscovered by the former some months before. They were supplied with pinole (parched wheat meal) bread, cheese, sugar, coffee, and tobacco for a week's subsistence, and with two 2-gallon and two 1-gallon canteens, and had also a dozen pounds of pressed alfalfa and twice as much rolled barley for the horses.* Jesus is 65, a former vaquero and nearly typical Mexican, claiming familiarity with the country, but erratic and inconsequent and little dependable in statements of fact or in any other way; he rode his own grass-fed horse which would eat but little barley. Pablo is about 40, of remarkably fine

*They were outfitted at Yuma by Jim Tucker, a miner and rancher; they left there in the saddle after noon on August 12, having shipped a bale of hay and a bag of barley with some of their food and canteens to Wellton; camping on the banks of the Gila north of Blaisdell, they started early Sunday morning and reached Wellton about mid afternoon, where they took their freight and fed and watered freely, leaving part of the food for the return. They started for Tinajas Atlas Monday morning "at the time of the morning star" (say three o'clock) and covered the thirty-odd miles in little over eight hours.

and vigorous physique—indeed, one of the best-built Mexicans known to me. In earlier life he was a sailor on Pacific vessels and afterward a wandering prospector and miner, and was tiding over the summer of 1905 by growing watermelons on a ranchita near Gila City. He measures about 5 feet 7 inches, weighs normally about 155 pounds, and is notably deep-chested and round-bodied, with—for a Mexican—exceptionally robust limbs; he is reputed a large eater and heavy sleeper, and is of phlegmatic disposition, given to drowsing in the shade rather than working in the sun—yet when fully started he is vigorous and pertinacious, walking (barefoot or in sandals) in preference to riding, and moving with a quick and strong upspringing gait enabling him to pass on the road all but the best horses. In a word, he is a particularly fine type of the animal genus Homo—a most matter-of-fact man of action in his little world, albeit lightly burdened with acute sensibility, imagination, or other mentality: indeed, an ideal man to endure stressful experience. Between periods of repose he awakens into an energetic habit, openly scorning hunger and thirst, and expressing implicit confidence in his ability to withstand far beyond ordinary men these habitual inconveniences of the range. He rode Jim Tucker's best horse—an animal of exceptional bottom, well inured to desert work.

While their horses ate, Pable and Jesus lunched with Jose and me, feasting on jerked cimarron (mountain-sheep meat) in addition to their own comestibles. Against my advice (which was to leave at 1 a. m. Tuesday, the moon being about the full) they set out for their El Dorado about five o'clock; but in half an hour they returned, having decided to wait until morning on the ostensible ground that the horses had drank but little, though in reality because my judgment had finally worked in. Next morning Jose stirred up Jesus, and the two pulled Pablo from his saddle-blanket for breakfast; and they got off just before daylight. This was the real beginning of the journey—about 3:45 Tuesday morning, August 15.

Soon after midnight Jesus came in alone, with both horses, reporting that Pablo had sent him back from a point about 35 miles southward to re-water, he himself going forward on foot with a 2-gallon canteen and a stock of pinole, with the agreement—an utterly foolish one in desert life—to rendezvous thirty hours later not on the trail but on the farther side of a nearby sierra. Jesus drank, ate, watered, fed, and struck the trail again (with five gallons of water) about 3:30 a. m. on the 16th. The next morning about 7 he again came in alone with both horses, reporting that his own animal had broken down after a short distance and that he had ridden the Tucker horse by a better route both to the rendezvous and to where he had left Pablo at the edge of the sand hills; and that he had been unable to find either the lost man or his trail. He explained that Pablo had probably gone on to Agua Salada (as he had advised all along, misstating the distance, etc.) and

proposed after resting to return to Wellton and Yuma. He was indeed exhausted, having ridden perhaps 150 miles in about 52 consecutive hours; and his horse was practically broken down and the Tucker animal tired. On putting together all statements from both Pablo and Jesus, I was unable to form a judgment as to whether or not Pablo had gone forward to Rio Sonoyta, though this seemed probable; yet I decided to give him another chance for his life, and so compelled Jesus to rest over a day at Tinajas Altas, and meantime sent Jose (an expert trailer among his tribe of trailers) out on the Tucker horse to find Pablo's trail, giving him full instructions as to routes, smoke signals, etc., (for I knew the region better than he) and directing him to go to the limit of his horse's endurance and then to his own limit beyond. Jose carried a feed of barley, a couple of pounds of pinole and dates, and two extra canteens; he got off about ten o'clock Thursday, August 17. Stopping only to send up smokes at intervals, he followed old Jesus' ill-chosen trails and easily located the point at which Pablo left him on the 15th; thence he followed the foot-trail with difficulty in the darkness of the early night; reaching the sandhills about moonrise, he left the horse and labored through the almost impassable sands seven miles further—then returned as he came, making signal fires here and there. Reaching the horse in the dawn, he arrived at camp just before noon Friday, the 18th. I was convinced that further effort would be bootless, since even if Pablo had not gone on to Agua Salada en route to Agua Dulce and Santo Domingo, as seemed probable, he could hardly still survive—for he had already been out over three days with only one day's water, and two-thirds or three-quarters of those who die from desert thirst expire in less time; so although Jesus and his horse were still unrestored and the Tucker animal had been moving almost steadily for 80 hours and over 225 miles I hurried Jesus off toward Wellton and Yuma to report his virtual abandoment of the man he had undertaken to guide and protect—supplementing his prospective oral report with a special delivery letter to El Padron (Jim Tucker), to be mailed at Wellton in time for the two o'clock train Saturday morning.*

So ended the first episode in the Pablo Valencia event, in the afternoon of August 18. I remained uneasy a day or two longer, and next day and the day after climbed a neighboring peak 750 feet high, and walked out a few miles on the trail to seek for sign; then Jose and I fell into normal camp routine.

In the graying dawn of Wednesday, August 23, the grasp of sleep relaxed in a vivid dream recalling a picture often presented in the ganaderos (half-wild cattle ranges)

*Jesus started about four o'clock on August 18 and should have reached Wellton between one and two, thus getting the letter into Tucker's hands early the next morning, and he should himself have arrived in Yuma early Sunday morning, August 20; but he slumped characteristically on the Wellton stretch and made a needless camp beyond, so that he and the letter arrived about the same time on Monday afternoon.

of western Sonora—the picture of an orderly file of stock led by a stalwart bull and trailing down to yearlings in the rear, the leader iterating his deep grumbling roar of assurance to his herd, which at last—as on the range—rose in quick crescendo into the ear-piercing bellow of challenge and defiance to all other kine. I awoke at the dream-sound to realize its actuality, and turned my head half expecting to see the herd; instead, there stood Jose, just arisen from his blanket, looking down the arroyo. Seeing my movement, he asked, "What is it? I thought it was one of them, lions, roaring like in the Zoo." Now fully awake, I replied, "It must be Pablo; take the canteen." Though wholly incredulous, he mechanically siezed a canteen and a strip of manta which with his coat made a pillow, and after a call in reply, ran down the trail. I soon followed, carrying another canteen and a medicine case; and on the arroyo sands, under an ironwood tree at the foot of the little Mesa de los Muertos with its two-score cross-marked graves, came on the wreck of Pablo, with Jose already ministering unto him.

Pablo was stark naked; his formerly full-muscled legs and arms were shrunken and scrawny; his ribs ridged out like those of a starveling horse; his habitually bulging abdomen was drawn in almost against his vertebral column; his lips had disappeared as if amputated, leaving edges of blackened tissue; his teeth and gums projected like those of a skinned animal, but the flesh was black and dry as a hank of jerky; his nose was withered and shrunken to half its length, the nostril lining showing black; his eyes were set in a winkless stare, with surrounding skin so contracted as to expose the conjunctiva, itself black as the gums; his face was dark as a negro, and his skin generally turned a ghastly purplish yet pallid gray, with great livid or blackish blotches and streaks; his lower legs and feet, with forearms and hands, were scarred and scratched by contact with thorns and sharp rocks, yet even the freshest cuts were as so many scratches in dry leather, without trace of blood or serum; his joints and bones stood out like those of a wasted sickling, though the skin clung to them in a way suggesting shrunken rawhide used in repairing a broken well; from inspection and handling, I estimated his weight at 115 to 120 pounds. We soon found him deaf to all but loud sounds, and so blind as to distinguish nothing save light and dark. The mucous membrane lining mouth and throat was shriveled, cracked and nearly black, and his tongue shrunken to a mere bunch of blackened integument. His respiration was slow, spasmodic, and accompanied by a guttural roaring—the sound that had awakened us a quarter-mile away. His extremities were cold as the surrounding air; no pulsation could be detected at wrist, and there was apparently little if any circulation beyond the knees and elbows; the heartbeat was slow, irregular, fluttering, and almost ceasing in the longer intervals between the stertorous breathings.

The victim was, of course, unable to articulate or to swallow. Water

was poured over his face, into his mouth, and over his adomen, and rubbed into his body and extremities, the skin first shedding and then absorbing it greedily as a dry sponge; dilute whiskey was forced into his mouth and rubbed on his chest with immediate effect (doubtless the greater because Pablo was a habitual teetotaler); and when in half an hour swallowing motions began feebly, both whisky and a powerful heart stimulant (digitalis-nitroglycerine-belladonna talblet triturates) were administered internally. In an hour he drank, though most of the water was immediately expelled from the stomach; in two hours he began to partake of food—a bird fricassee with rice and shredded bacon; in some three hours (soon after sunrise) he was able with some help to walk into camp. By this time he had ingested and retained about 2½ ounces of whiskey with 5 ounces of water and 2 or 3 ounces of food; his external tissues were saturated and softened, circulation was restored sluggishly in his extremities, and his numerous wounds began to inflame or exude blood and serum. Articulation slowly returned, and in a cracked voice, breaking involuntarily from bass to falsetto, he began to beg pathetically for "Agua, agua" and to protest against the "dust" which we were compelling him to sip; he even failed to recognize coffee, which was given in small quantities.

As Pablo's strength returned in the course of the day, two abnormal conditions developed: The more disturbing at the outset began with local inflammation about the cuts, scratches and bruises suffered in creeping the last seven miles over a cactus-dotted and often stony plain, and extended into a general feverish and irritable state doubtless intensified by the long-continued nerve-strain; the other was the passing of the hoarse, stertorous breathing into a sort of spasm apparently affecting stomach, diaphragm, intercostal muscles, and the upper part of the body generally—a sort of combined retching and hiccoughing so severe as to rack the victim from head to foot and induce violent vomiting. A preparation of bismuth in tablets gave some relief, and pepsin-pancreatin tablets taken with food were beneficial; yet the spasms were so severe and persistent as to threaten fatal exhaustion. Toward evening urinary excretion began feebly, at first accompanied by blood and mucus; it was over two days before movement of the bowel began. On the third day (satur day, August 26) vision and audition became normal, and Pablo began to notice things in a strange infantile way, as if a power of apperception stirred; he stared at and evidently recognized shrubs and rocks about the camp, scrutinized and curiously felt of his hands and feet, and also began to recognize water; while his mind began to place Jose and me in his fabric of definite cognition—for we had been mere shadow objects before. He surprisedly examined his wounds, which were then healing satisfactorily, and described the spasmodic retching as due to the forming of a "ball" in his stomach. On the second day he had muttered, half to himself, the events of his

journey; on the third, he described them spontaneously and in reply to inquiries in such manner as to yield a definite and doubtless fairly trustworthy itinerary.

On Sunday, August 27, came Jim Tucker with four-horse wagon and extra saddle-animals accompanied by two or three men to search for trails and remains; at first Pablo hardly knew them and shrank from them as creatures of a nightmare; but they showered him with attentions and forced on him heaping plates of stews, frijoles, and fried bacon, with whole loaves of soggy Dutch-oven bread, with the result that the spasms were intensified and accompanied by effusions of biliary matter streaked with blood. For a day Tucker planned going on to the "lost mine", leaving Pablo with me; but the relapse was so serious and the recurrent spasms so severe that by Monday noon I felt compelled to prescribe a return to Wellton. About sunset the spasm-racked wreck was made comfortable in the wagon; about eleven, when a halt was made to rest the team—for the nearly trackless sands dragged heavily— I judged there was an equal chance of getting the patient alive to Wellton. At two we were up, and about seven we drew into the clean sand wash in the rear of the station. Twenty minutes later we had some raw eggs, and Pablo's crisis was past. Later in the day watermelons were secured; and next morning we were in Yuma. Pablo was guarded for a few hours, but spent practically the whole of August 31 deliberately and methodically devouring watermelons, with occasional lapses into slumber; and in a week he was well and cheerful, weighing 135 pounds or more—though his stiff and bristly hair, which had hardly a streak of gray a fortnight before, had lost half its mass and turned iron-gray.

Pablo's itinerary, taken partly from his nearly meaningless maunderings as speech returned but chiefly from connected statements largely in reply to inquiries, runs thus:

Tuesday, August 15: Left Tinajas Altas at 3:45, horseback, with Jesus; rode some 35 miles, reaching "sand hills" about one o'clock; thence went on afoot with 2-gallon canteen (full at starting), pinole, tobacco, serape, duck coat, prospector's hammer, canvas specimen bag, cigarette papers and matches, faring some ten miles through the sands before stopping to sleep. Drank three or four times and took pinole twice.

Wednesday, August 16: Starting with the rise of the morning star, he reached the ledge of which he was in quest about mid-forenoon, and collected specimens, erected monuments, and posted notices for his claim, finishing this work before midday. He ate a little pinole and drank sparingly (as he had done before starting) for the canteen was nearly empty. Starting northward, he began search for a road described (falsely) by Jesus, and straggled rather aimlessly over the sands, moistening his mouth occasionally but not swallowing water, until the canteen was empty; at nightfall he reached an arroyo in which he fancied signs of water. In the

darkness of the early night (before moonrise) he abandoned his nuggets and soon after threw away his stock of pinole and his coat and serape. Failing to find water, he sought sleep in the sands; and when awakened by mouth-dryness obtained some relief—after the fashion of all Mexicans and most Americans in like cases—by occasionally filling his mouth and gargling his throat with urine.

Thursday, August 17: He set out early with little regard for direction, seeking trails and tinajas, but working northward; unable to withstand the heat of midday, he lay down in an arroyo and ate calabasitas (wild gourds of intense bitterness) which his stomach rejected. Arising as the sun declined, he threw away shoes and trousers (with money, knife and tobacco in the pockets) and wandered on northward, finding occasionally old trails which either faded away in a few miles or else led into sands or impassable rocks—trails which were mostly figments of disordered fancy. One led to an immense tinaja; but it was dry. During the day he had frequent recourse to urine, though he nearly lost the power to swallow; during the night he saved every drop of the excretion in the canteen, which he still carried.

Friday, August 18: In early morning he walked a few miles but was overcome by the torrid heat and crept under the shade of a paloverde overhanging the bank of an arroyo; toward evening he arose and chewed paloverde twigs with little effect save to irritate his mouth and throat. Setting out northward before sunset he found a mescal (a variety of agave) and chewed the stipes, extracting a little moisture; at sunset he caught a few flies and spiders, which he chewed and tried to swallow. Still he wandered northwardly, having in mind first the rendezvous with Jesus, then the old Yuma Trail he had traversed years before. Toward morning he became convinced that Jesus had deliberately misled and abandoned him with murderous intent and the plan of thus securing his El Dorado; and his wrath spurred him on with the aim of knifing his deceiver—a potent incentive which carried him miles and doubtless saved his life. He continued to relieve mouth-thirst with urine.

Saturday, August 19: In early morning he found mule-wagon tracks and recognized the Old Yuma Trail (apparently he was just west of Tule Playa and east of a sand hill-malpais ridge—i. e. about 27 miles east of Tule Well. He struck the trail, but soon fell under the heat and lay all day in an arroyo. In the afternoon he saw one of the large light-green scorpions of the region; it looked so luscious to him that he captured it, ground off its sting with a stone, and devoured it. As before, he used urine, swallowing part. Toward evening he resumed journeying northward, often falling; toward morning he found (or thought he found) Jesus' trail where he had wandered in search

of the hopeless rendezvous set for the 16th. During all of Saturday and throughout this night on the trail he was bouyed up by a new incentive—the hope of reaching Tule Well and casting himself into the moist mud at its bottom, and at the worst dying in the dampness and coolness 37 feet below ground; he knew the notion was half-insane and the hope wholly hopeless, yet unto them he clung as to an inspiration. Meantime, he constantly sought insects to chew, and continued using his urine, now "mucho malo" (very bad.)

Sunday, August 20: In early morning he pushed on westward, often sitting down, sometimes falling, and tried crawling—with little success. His vision was vague; the mountains danced, and the cactus and chapparal clumps moved to and fro before his eyes; and he passed the first Tule Well guidepost unseen (Tule Well is a mile or two north of the main line of the trail) in early morning, and kept on westward to the second one, west of the well—where the sun was growing strong, and he was too weak to work back along the trail. Regarding his passing of the well as an omen of speedy relief, he hung his hat on the guidepost and after creeping to one or two tinajas—known to him of old—which he found dry, he lay all day in the shade of the rocks, utilizing every drop of urine, which now dripped scantily and involuntarily. Toward evening he again bethought himself of Jesus and the pleasure of knifing him, and was inspired to further effort; but he fell so often as he struggled forward that he was only at a remembered camp-site 3½ miles west of Tule Well when day broke again.

Monday, August 21: On reaching at dawn the camp-site only 19 miles from Tinajas Altas, he felt sure of relief and stretched himself across the trail so as not to be missed by rescuers—there he dozed and slept, starting up frequently at fancied sounds of wheels and hoofs. The sleep and coolness (only 91 degrees) of the day and the short distance traversed the night before had their effect; and toward sunset he set out again westward along the trail bouyed by the certainty of at least finding full canteens (of which Jesus had indeed left two at impossible places). The course was down grade, along the arroyo and across the black malpais mesita on which the ancient graves lie thick; and his hope was strong, though the mountains were no longer seen in their places and he had to feel the trail every few yards to be sure he went aright. He often thought he saw Tinajas Altas with abundant water and food just before him, yet was not wholly cast down on feeling a landmark he knew to be miles away; so he made, with many rests and some naps, 12 miles.

Tuesday, August 22: In early dawn his mind was reaching out bouyantly to Tinajas Altas as but a few steps away, when he half-saw and then fully felt over the six-mile guidepost (about seven

miles from camp), and awoke to the crushing certainty that no canteen hung there, and the still more overwhelming realization that he never could cover the remaining miles of sand—for his urine had ceased to flow hours before, and he felt his last recourse gone.* As the sun rose he sought the shade of a shrub and there knelt in final prayer for the dying; then he laid himself down with feet and face to the eastward, made the sign of the cross, and composed himself for the end. There—and this was his clearest concept, unreal though it be—with the rising of the sun he died, and his body lay lifeless under the burning rays, though his innermost self hovered about, loth to leave the material husk. The sun swung across the shimmering vault, and darkness fell; in the chill of evening (fortunately an exceptionally cool night—just above 82°) some vague shadow external to his Ego stirred and then struggled aimlessly against chapparal and cactus along the most trying stretch of El Camino del Diablo. Sometimes he felt

*Pablo thought he left at the six-mile guidepost his hat and underclothes, though they were not found on subsequent search; and it is more probable they were left at the western Tule Well guidepost. His trail here showed that he seldom walked, and then but for a few steps only to fall again, and mostly crept wanderingly amid the thorny clumps, though sticking fairly well to the trail.

TEMPERATURE AND MOISTURE.

Dates	TEMPERATURE							MOISTURE			
	Self Registering Therm's				Psychrometer			Humidity		Rain (in.)	Cloudiness (tenths of sky)
	Maximum	Minim.	Range	Mean	Dry Bulb	Wet Bulb	Depression.	Dew-Point	Relative Humidity		
Aug. 14. 8 pm	99°1	85°1	14°0	92°1	91°0	65°0	26°0	48°0	23.0%	0	0.1—
15, 8 am	91.8	78.8	13	85.3	90.5	62.5	28	41	18	0	.1—
8 pm	98.9	90.9	8	94.9	92	66.5	25.5	51	25	0	.1—
16, 8 am	92	81	11	86.5	86	69	17	60	42	0	.2
8 pm	99.5	85	14.5	92.2	91.5	71.5	20	61.5	38	0	.1—
17, 8 am	94	79.7	14.3	86.8	93	68	25	54	26.5	0	.1—
8 pm	103.2	93.2	.10	98.2	95	69	26	54	25.5	0	.1—
18 8 am	95	83	12	89	87	76	11	72	60.5	0	.1—
8 pm	96	86.6	9.4	91.3	88.5	73	15.5	66	48	0	.8
19, 8 am	88.5	80.5	8	84.5	87	74	13	69	54.5	0	.1
8 pm	98.4	85.4	13	91.9	90	73	17	65	44	0	.0
20, 8 am	90	81	9	85.5	87.5	73	14.5	66.5	50	0	.1—
8 pm	99.1	87.3	11.8	93.2	89	71.5	17.5	63	42.5	0	.1
21, 8 am	89.9	78.4	11.5	84.2	88	74	14	68	52	0	.6
8 pm	91	87	4	89	90	71	19	62	39	0	.6
22, 8 am	92.1	81	11.1	86.7	91	69	22	57	32.5	0	.2
8 pm	100	90	10	95	91	71	20	61	37.5	0	.7
23, 8 am	91.8	82.1	9.7	86.9	91	69	22	57	32.5	0	.2
Means	95	84.2	10.8	89.6	89.9	70.3	19.6	59.8	38.4	0	.2
Averages Aug. 1-28	101.8	81.7	20.1	91.7	92.3	69.7	22.6	56	32.9	.004	.12
May 21-Aug. 28	99.3	77	22.3	88.2	88.9	64.5	24.4	46.5	27.1	.0012	.067

half-alive and wrung by agony of severing spirit and body; oftener he felt that the naked body was pushed and dragged and belabored and tortured by something outside; he knew its voice tried to cry out in protest or call for rescue, but did not feel the voice his own. So the night dragged on, until at early dawn the vague consciousness knew itself near the camp with the certainty of relief, and was dimly surprised at a bellowing break in the final call.

Wednesday, August 23: It was this last call that fully wakened Jose and me; after uttering it Pablo apparently crept some 50 yards down the last descent to the arroyo below the Mesa of the Forty Graves. Of this day, with break, Pablo remembered nothing its physical shock and psychical clearly.

Summarily: Pablo was in the desert just eight days (and nights), with one day's water; he rode in the saddle 35 miles and walked or crept between 100 and 150 miles. For nearly seven days, or fully 160 consecutive hours, he was wholly without water from sources exterior to his system, save the few drops extracted from the scorpion, agave stipes, and insects—a desert record without parallel known to me; for half the victims of desert thirst die within 36 hours of deprivation, three-quarters within 48 or 50 hours, and nearly all known to survivors within 72 to 80 hours (three days and nights), or hardly half of Pablo's stress. For five days he consumed his urine; ordinarily the reconversion of excreted liquid is hardly helpful if not wholly harmful, yet in Pablo's case it seems to have materially prolonged vitality. For nearly nine days (August 17-26) his bowels were inactive, and for two days his kidneys failed to function. The eight-day siege lost him 35 or 40 pounds (or 25 per cent.) of his weight, chiefly through evaporation from skin and membrane; he also suffered fully two-score cuts, scratches and bruises, each of sufficient severity to give some shock to the system; and his mouth, esophagus, and stomach were seriously deranged by his desperate efforts to relieve the thirst-torture. The most striking feature of the case was the absence of wholly insane delirium; he was, indeed, affected by the revulsion against gold as shown by the abandonment of his nuggets and the casting away of his money; he was possessed by delusions as to the wetness of sands and the moisture of articulates and shrubs; he was obsessed by the desire for vengeance against Jesus, the dream of casting himself in Tule Well, and the delusion of death—yet he never lost his trail-sense, and apparently squandered little vitality in those aimless movements that commonly hasten and harden the end of the thirst-victim.

The nature of the case and the severity of the stress successfully encountered by Pablo Valencia cannot fully be understood without considering the utterly desert character of the region and the torridity of the season. The 100-day record of temperature and humidity at Tinajas Altas served to define a vapor-zone about Gulf of California in

which a large part of our summer storm-centers find origin; and although most of Pablo's route lay outside this zone and in a hotter and drier belt, the record from the evening of August 14 to the morning of August 23 approximately indicates the attendant climatal conditions. This record is appended, with the means for the 9-day period, and also the averages for both the August 1-28 and the 100-day periods. From this record it appears that Pablo was favored by exceptionally low temperature and high humidity; yet the maximum temperatures ranged from 88.5 to 103.2 (averaging 95), and the minimum night temperatures from 78.4 to 93.2 (averaging 84.2), i. e., were always above the somewhat variable yet most important physiologic value, which may be termed the *perspiration-point:* the value at which the burden of elimination is transferred either from kidneys and lymphatics to the skin, or from the epidermal to the internal eliminative structures, as the point is passed. Pablo was also exceptionally favored by clouds; for although the sky was never wholly overcast, the morning and evening average of cloudiness reached two-tenths of the total sky. He was fortunate, too, in the high relative humidity for a desert range; at Tinajas Altas the percentage of aqueous vapor ranged from 18 to over 60 (averaging 38), indicating that along his route it probably oscillated between 15 and 55.

DISCUSSION.

Dr. Funkhouser:—We know that in the accounts of the ancients, some of which refer to thirst, these sufferers sometimes drank horse's urine. Did not the taking of the urine in reality complicate the trouble instead of relieving it?

Doctor McGee:—In most cases of which I have known the ingestion of urine seemed only to intensify the sufferings, and before observing Pablo's case I was of opinion that the recourse was always injurious rather than beneficial; yet in his case I feel fairly satisfied that the use of urine prolonged his endurance and so saved his life. From the evidence of this case and certain other data on which it throws light, I now incline to think that in general the use of urine may be beneficial to persons well-inured to desert conditions but would be injurious to the uninured.

Dr. F. A. Glasgow:—Is there not a plant containing water which is found in the desert?

Dr. McGee:—Yes, there is a plant commonly known to Mexicans as the bisnaga and sometimes to Americans as the "niggerhead" which contains pure water, but Pablo was not acquainted with its virtues and made no effort to use it.

Dr. Ehrenfest:—Are convulsions in these last stages of thirst common? As this patient got a typical uremia, the question is might he not have had uremic convulsions?

Dr. McGee:—You will understand that I do not speak as a medical man but as a layman who has picked up more or less information of a medical character. Convulsive movements, including retching and spasmodic breathing, are not at all uncommon in extreme thirst, though ordinarily the patient passes into delirium or insanity so pronounced

that the convulsions are less notable manifestations. Whether these convulsions are of uremic origin, I am hardly prepared to say.

Dr. Barclay:—Do those who habitually practice total abstinence from alcohol stand such a strain better than alcoholic drinkers?

Dr. McGee:—Yes, that is the opinion of medical men throughout the arid regions.

The President:—What are the phenomena of thirst observed in animals that die of thirst in the desert? Do they have these attacks of delirium or convulsions?

Dr. McGee:—I have never known of convulsions or recognizable delirium in thirsty animals; but it is to be remembered that when animals die of thirst their owners, if with them, are under such stress that they seldom note their precise condition. Horses outlive all but well-inured men when both are alike deprived of water apparently because their bodies (including body-water) are of greater cubical content in proportion to surface, so that evaporation is less effective, and also because their skins and other tissues are harder; but even well-inured men are commonly delirious before the horses succumb.

Dr. Barclay:—Those familiar with the training of athletes know that dietary methods differ widely One method requires the sparing use of drinking water and other fluids while training. I recall one pugilist's statement, that by the time he went into a prize fight, he was "so dry he could not spit." I have known this man to spar for hours consecutively without fatigue and without perspiring enough to moisten a blotter. It is the method of many athletes not to soak themselves with water during the period of training. To relieve thirst, they carry a pebble in the mouth. I would like to know whether the method of habitually drinking large quantities of water just before crossing the arid zone, does not aggravate matters later.

Dr. Frank Glasgow:—The runners of Peru were accustomed to chew the leaves of the cocoa and in that way got a certain amount of cocaine. It has occurred to me that perhaps that overcame a certain difficulty in these cases of thirst, it prevented the evaporation from the mucous membranes, and perhaps the value of the leaves lay in that as much as in the increased power of resistance.

Dr. Warren B. Outten:—One of the most interesting points in Prof. McGee's paper is the manner of the oncoming death in persons who die from "thirst;" that is they die from an involvement of the arteries of the extremities thence extending up to the trunk. In listening to this vivid description of death from thirst there came to my mind a picture of death from "shock;" first a depression of the vital powers, this depression affecting the nervous system which in turn leads to depression of the circulation followed by contraction of the arteries generally, but more especially the capillaries and superficial arteries. Just in proportion to the extent of arterial involvement comes the surety of fatal termination. This description brings to my mind the history of a case

where a man in a railway wreck received such a shock from fright that his finger and toe nails together with his hair and beard had died, the influence exerted through the vaso-motor nerves by the impression being so great as to impair nutrition to such an extent that the patient never recovered. The real difference in death from excessive thirst and death from "shock" is only the length of time involved in each process; both die from contraction of the arterial system, the superficial vessels and capillaries then the larger vessels, extending in both instances from the extremities to the trunk and center of circulation. Arterial contraction is the cause in both instances, backed by a weakened heart. From the descriptions of death from freezing, the modus operandi is the same, arterial contraction extending from the smaller to the larger vessels.

The President:—Did his wounds heal rapidly and kindly? What was the elevation?

Dr. McGee:—The altitude of the lowest tank and of my camp-site at Tinajas Altas is about 1400 feet. The leading physical characteristic of the region is the purity of the air; Sierra Gila is the most utterly barren range with which I am acquainted, and the plains on either side are typical deserts with too little life to contaminate the air—hardly enough, indeed, to contaminate the few barrels of water gathered in the tanks during the midwinter and midsummer rains, and freely exposed during intervening months. No doubt the healing of Pablo's wounds was greatly promoted by the purity of the air; certainly there was no indication of gangrene. All of his nails became discolored, as did most of his phalanges, soon after circulation was restored in his extremities, and for a time I feared sloughing; but it did not occur. He lost about half of his hair, and the rest turned gray—perhaps half of the remaining headhairs (among which but a very few were gray before) with a third of those of his beard and body hair became white.

Regarding the use of water in athletic training: In my opinion, the experience of trainers of footballists and pugilists is worth much, and their practice is sound. The object of training is to develop a somewhat abnormal condition of the organism, a condition in which tissues are hardened and toughened by so modifying the normal balance between waste and repair that first the former and later, the latter are retarded.

In reply to the questions by Doctor Moore and Doctor Fleming: Pablo's stertorous breathing continued until sometime after we reached him; the condition changed gradually as the membranes of mouth and throat became saturated. At first it was of such loudness as to be easily heard 50 or 100 yards and accompanied expiration, the sound being a moan rather than snoring, though not produced by the vocal organs and apparently not controlled by volition. The distance to which the sound was heard may have been due in part to concentration between the converging walls of the gorge in which the camp was located; yet its audibility

to us was doubtless due largely to our habitude to the noiselessness of the desert night—a stillness so nearly perfect that the ear soon learns to detect the sound of a creeping insect yards away. So accustomed was I to the hearing of sounds at considerable distance that until Doctor Moore raised the question it did not occur to me to think of our hearing Pablo's stertorous expirations nearly a quarter of a mile away as at all remarkable.

Dr. Henderson:—Was there any permanent change in the man or was he finally restored to his former fine condition?

Dr. McGee: I followed the case only about a week, but I happen to know that Pablo and Jim Tucker have since gone out on another search for the "lost mine" so that he must have been practically restored to health and vigor.

I may venture to express the opinion that pure water would have been better than salt solution for the restoration of the thirst sufferer. What he required was increased volume and increased liquidity of blood. If I had had surgical instruments I should have tried injecting a little water in the desiccated extremities, and should have avoided the salt solution in the fear that his tissues were already overcharged with saline matter; in the absence of apparatus I sought to attain the same end by external application of water, trusting to osmosis to convey the water into capillaries and veins and thus into the circulatory system. Perhaps salt solutions might be beneficial in such cases, but remembering the essentially mechanical nature of thirst and the concomitant overloading of the blood with solid waste, my prepossessions would be against their use.

Dr. George Gellhorn:—The opportunity rarely presents itself to observe such extreme degrees of thirst but there are reports of some such cases found in medical literature. In 1899 Strubell, assistant to the University Clinic, at Jena, conducted a number of experiments with patients suffering with diabetes insipidus by reducing the daily amount of water required. In one case he completely cut off the supply of water for a number of days in order to investigate a number of problems and he did not discontinue this cruel treatment until the patient became violently delirious and was at the point of death. This patient's voice could be heard over the university grounds; the noise was so loud that it attracted attention and Dr. Strubell was made to discontinue the experiment. In this case the blood had thickened and the tissues had become dry. The experiment created a storm of disapproval all over Germany and Strubell was dismissed from the university.

Doctor McGee, In closing:—I may be permitted to emphasize the opinion that the whole subject of thirst is of interest and importance. On returning from Tinajas Altas through Yuma about the end of August, I noted in the Yuma and Los Angeles papers the details of the latest fatality from thirst in Death Valley, the items casually mentioning that it was the *thirty-fifth* for the season in that district

alone! Southwestern United States is in the throes of industrial development stimulated by the irrigation projects of the goverment and by several railway and mining enterprises; with the advent of uninured workmen and settlers, unaccustomed to the estimation of distances and ignorant of the appalling rapidity with which evaporation proceeds in arid regions, the danger of thirst-death seems to be an increasing one; and it would seem to me to behoove the makers of medical science to devise and diffuse improved methods of alleviating thirst torture, of restoring the thirst sufferers who occasionally straggle into the settlements, and of providing the more thoughtful denizens of the deserts with such preventive or ameliorative devices as medical science may be able to produce.

THE STATE SANATORIUM FOR THE TREATMENT OF INCIPIENT TUBERCULOSIS.*

BY L. C. MCELWEE, M. D., ST. LOUIS.

From the earliest dawn of medical history, humanity at large and the medical profession in particular, have been obliged to unfurl the flag of truce to the black crest of tuberculosis in one form or other. Until now, the pulmonary variety has been, with only occasional exceptions, so universally fatal that medical skill of whatever kind, or in whatever age, has been utterly baffled in its efforts to combat and control this disease. Fatal terminations of practically all cases treated have occurred with such mathematical precision that hope for life of the patient has been abandoned on the part of family and friends on the announcement of the diagnosis and the physician making the diagnosis, made heartsick and overwhelmed with chagrin at his utter helplessness to avert the swiftly approaching calamity. So certain has been the end that positive calculations have been made by the soon-to-be deceased or his heirs as to the post mortem disposal of his property, or the details of the burial permit by the hapless medical attendant.

But the sombre tone of this picture has been illumed by the light that has shone from the pine-crested summits of the Adirondacks during the past twenty years. Although at first a mere thread, the band of light streaming out of this place, has grown to be a great flood of golden, glorious light pouring over the entire civilized world, lighting up the remotest crannies with redolent radiance, until the eyes once dimmed by uncertainty and despair, now see with assurance and comfortable satisfaction, the realization of shadowy hopes that flitted to and fro in their minds and mingled with their fears in days of yore. The dead-

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house and dissecting room have for long established beyond peradventure the fact of sporadic cures of tuberculosis of the lungs. The history of these cases, if it could be obtained, often would reveal the surprising fact that the patient had either not been aware of the diseased condition of his lungs, or if so, had taken no treatment to alleviate it. But one conclusion could reasonably be drawn from these premises; and that was, that the omnipresent and all-conservative *Vis Medicatrix Naturae* was chief of the only discernible curable agent. Though scanty in extent and details, the facts served as an inspiration to the minds of the genius who saw them and laid them up in the granary of observation against the day when they might be turned to account for good for the entire world. To imitate nature's process as nearly as possible and to promote and stimulate its operations, was the aim and object of Dr. Louis Trudeau of New York City—himself a subject of the malady—who more than twenty years ago formally established what was probably the first sanatorium for the treatment of incipient pulmonary tuberculosis in the world. The causative factor of the disease had just been discovered, demonstrated and published to the world by Koch, but the *modus operandi* of the pathogenic action of the tubercle bacillus was not so well known then, if at all, as it is now.

But it was then and has ever since been apparent that the incipient cases were the only ones, as a class, in which a more or less permanent benefit could be obtained for the sufferer. Such a thing as a permanent cure to be obtained was dreamed of only in the reckless abandon of the imaginative fancy of the most prodigal optimist. But the lessons of the dead-house and the dissecting room were fixed indelibly on the minds of certain genii, and while the main column of the medical army marched along its weary way of diurnal routine, these master minds were revolving around this pathological vortex, evolving plans of cure which are now delivered to us in all the beauty of mature development. It matters little to us or to those to be benefited, that the period of gestation was twenty full fat years, or that the creature delivered is one of twins; the other now presenting with prospects of imminent engagement and reliable promise of early delivery.

It is not now too early to foresee that there will be two placentas, because, contrary to custom, *one* has already been delivered in the form of the State Sanatorium; the other having been forecasted to be a certain powder which is called by its discoverer "T. X."

After the rupture of the amnion of, perhaps, pardonable secrecy has disclosed the finished product, it will, of course, be better known, both as to appearance and effects. The prodromal signs, however, seem to indicate that the second or junior twin will materialize in the form of an especially prepared food or article of diet. Should this suspicion become a fact, it is unavoidably sure that the pair will grow and flourish together under the same roof-tree and contribute to each other's mu-

tual benefit, and together accomplish the desired cure of the patient taking them thereby reflecting glory on their progenitors and conferring health on thousands and tens of thousands of those coming afterwards, and happiness on all concerned.

The plan already delivered to us and in vogue now in more or less all civilized countries, contemplates the fullest development of the aforementioned *Vis Medicatrix Naturae* and accomplishes the cure credited to it so far as we are able to know, through this means alone. No medicines of any kind being given with the specific end in view of in any way influencing the pathological process in progress in the lung. The chief positive factors being a highly nutritious and easily digested diet, administered according to the best known physiological facts concerning digestion, combined with an unhindered and unlimited supply of fresh air, thus building up tissue and promoting constructive metabolism in as far as possible, and out of this a maximum of vital energy is developed. The negative element in this plan is the enforcement of physical inactivity or rest, that the system may not expend any energy generated by the oxygenation of the ingested proteids and fats in the tissues for any other purpose than resisting the attack of the cohorts of bacilli in the infected areas and their toxines in the blood and the development of a maximum of constructive vital energy.

The time is not remote from now when it was generally deemed necessary that a climatic cure should be associated with a considerable altitude. Hence mountainous regions have been, and are yet generally considered as essential to good results in tubercular sanatoria. The rarity and dryness of the air as well as its purity have been credited with the benefits and these factors were evidently uppermost in the mind of Dr. Trudeau himself, when he located his sanatorium, for when he built his first cottage, he erected it well toward the summit on the highest part of the highest hills he could find in the State of New York. In addition to the air and altitude it was for long thought that the balsamic breezes of the pine forests of Minnesota and Georgia were the healing agents, when the patients who recovered there returned to their homes and accustomed occupations. Dr. Trudeau was not unmindful of this phase of the case, and located his cottage in the midst of a pine forest, at once obtaining altitude, unlimited rare air and that made balmy by the aroma and the fragrance of the pine trees abounding thereabouts.

But the unmistakable cures that were made on the torrid plains of Texas were just as real and brilliant as those of the Rockies or Adironacks, but there was no altitude to account for them; no dry air, nor fragrant pine forests, but still the patients recovered. Dr. H. McHatton mentions a notable instance in which some ten families of Spanish nobility, who were so extremely infected with tuberculosis that they were confronted with the alternative of decimation or the discovery of a cure. They migrated to the in-

terior of Central America, and without other influences than those provided by Nature, or intermarrying with the natives, became entirely free from infection and in the course of a few decades, were entirely well. The pronounced cases terminating fatally, of course, in the beginning, but on the whole the disease was arrested and finally exterminated, and that individual community is now and has been, free from the stigma of tuberculosis, these fifty years. The one salient curative factor in all these cases is fresh air. And to the physiological chemist that means oxygen, and oxygen means systemic activity, and systemic activity means augmented vital energy, and augmented vital energy means a maximum of vital resistance, and that means death to the tubercle and other bacilli, and all that means *cure. Vis Medicatrix Nature Triumphant! ! !* and thereby hangs a tale!

In the process of the evolution of the tubercular sanatorium it has come to be an acknowledged fact that altitude does not play the all-important role in the cure of phthisis that was so long ascribed to it, although it is not to be in any wise deprecated or ignored, yet it is not an absolute essential, for instances are abundant where the most brilliant results are being obtained at sea-level, and in one place, a considerable distance below it; the most notable of which are in New York City and Philadelphia. In these cities cures are being made daily with the patients in cots on the roofs or in the upper stories of houses with all the windows open, with the smoke and grime, unavoidably incident to the city, notwithstanding. The first notable change for the better in these patients that become residents in a sanatorium, is the disappearance of the fever. Following that the cough, and coincidentally, the disappearance of the bacilli from the sputum, and the expectoration itself and the slight hæmorrhages, if there have been any. The weight then increases more or less rapidly according to the weather, being most noticeable in the cold weather, and the colder the weather, the more weight taken on. The barometer shows that the air then is the most dense and is dryer than in any other condition, and all this means oxygen, and this means exhilerated function and molecular activity, which is a condition entirely inimical to the bacilli and they die. The chief essential, the grand characteristic of this plan of treatment is the enforced and invariable life in the open air. Day and night, winter and summer, wet or dry, hot or cold, clement or inclement; sun or rain, no breath of air must be taken that bears a suspicion of having been ever breathed before. All other aspects of the treatment are considerations of detail merely. They are of importance or not in proportion to how much they contribute to the bodily comfort of the patient and preserve his vital energy. Because the system of the patient pays a large percentage of profit on daily balances, when no checks are drawn against the savings account,but on the other hand, charges usurious rates on any draft that may be made on the original deposit, for

whatever reason. This soon becomes apparent to the most giddy subject (who, as you know are people who range from 15 to 35 years with the great majority of them being in the near neighborhood of twenty) and they are quite willing to economize on vital energy, when they have been in the place a fortnight. The most delightfully striking feature of the patients as a class that presented itself to us, when we first entered a sanatorium, was the absence of the characteristic faces of phthisis. When our carriage first entered the grounds of the Trudeau Sanatorium we met a couple of lasses about 18 years of age coming out of the grounds bare headed and bare armed to the elbows. Their cheeks were as ruddy as bell-flower apples and their eyes were as bright and sparkling as if they had just gotten money from home. Their gait was decided and elastic with a swing that denoted strength and fredom from restraint of any kind. To our great surprise, the driver told us that these were patients in the sanatorium, and greater still was our surprise when we found these characteristics were true of the entire two or three hundred patients save the few, (ten or eleven) who were sick abed in the infirmary. All the ambulant patients spoke of their improvement and ultimate cure with the utmost assurance and in the most matter-of-course tone of voice. The time required to complete a cure is from two months to two years, according to the degree of infection and the recuperative power of the patient. The only patient that we saw whose record showed a cure in two months, was a man aet. 32, in the Rutland, Mass., Hospital, who had submitted to a hypodermic injection of 5 cc. of tuberculine as a diagnostic measure, on his first admission to the institution. As this procedure was not routine and was only practiced with the patient's consent which was often denied, through ignorant fear, no satisfactory data could be determined on this point. The Trudeau sanatorium consisted of some 32 detached cottages, scattered in a desultory manner over the eastern slope of a big mountain and accommodated in the neighborhood of two hundred and fifty patients. The institution is maintained entirely by private benefactions and the income from the patients, which averages nearly $15.00 per week; the cost of construction is enormous, for the donors of the cottages have seemed to vie with each other as to who could expend the largest amount of money in the smallest scope, no detail being omitted that might contribute to the comfort of the patient or cheer the tedium of the enforced idleness (rest) incident to the sanatorium discipline. Although handsome fortunes have been expended in several of the cottages, we saw only two which met with all the requirements of the occasion, and they were built to accommodate only four patients each, at an individual cost of some $15,000.00. The New York State Sanatorium is located some four miles from this at a little railway station called Ray Brook, and in its present uncompleted form, represents an expenditure of $225,000.00; is an epitome of all that it

should not be. The superintendent and assistants warned us not to adopt its chief features into our institution, for they were not proving, and would not be satisfactory. It is a four story brick building, arranged in general, on what may be termed, the ward plan; *i. e.*, the large wings were composed of wards, one above another, so that a great number of patients could be accommodated indoors at night, and was intended to be economical, but had not resulted in accomplishing either economy or accommodation. The Commission visited this institution on Sunday afternoon, and as we were around the grounds and through the buildings for several hours the time for supper had arrived before we were ready to leave. The matron kindly invited us to take this meal with her before we left. When all of the patients and we were seated, we naturally expected to hear more or less coughing on the part of somebody during the supper hour, but to our pleasant surprise we heard not one single cough by anybody during all this time, and while we were inspecting the buildings and grounds, heard only one patient coughing, and she had been there only two weeks. This peculiarity was characteristic of all the sanatoria visited, and will be of ours.

The Rutland, Mass., buildings were better adapted to the needs of the occasion, but were faulty in that the narrow portion of the building is presented to the south. They are arranged like the fingers of your hand when extended and strongly abducted, with the administration building corresponding to the wrist. They represent an outlay on the part of the old Bay State of $600,000, with a capacity of 250 or 300, and a cost to the state of $9.00 per week per patient. In the plans as proposed by our architect and adopted by our Commissioners, you will find that all the comfort and convenience, and even luxury of the "cottage system", and all, or most all, of the economy of the "ward plan," have been accomplished. The completed institution, which contemplates an outlay of $375,000, will accommodate 250 patients, exclusive of the necessary help and superintendent and assistants. It will consist of ten one-story villas, with a capacity of 25 patients each, having a frontage of 80 feet, southern exposure, by depth of 35 feet at the ends east and west. The sun will shine into the front of these buildings for eight hours each winter's day, and proportinately longer each day as the sun approaches the summer solstice. All these buildings will be arranged on either side of the triangle, with the base extended towards the South and along the brow of the hill on which the site is located. At the apex of the triangle pointing toward the North, will be the "Chateau," or Administration building, and behind that, further North, will be the medical villa, for the purpose of examining the patients on admission and from day to day to note and record their progress, operate upon any that in emergency might need it, and treat any that might for other causes, need medical attention.

While the architect calculates that the cost of the completed institution

will be $375,000.00, we are now a long way from that end, and ominous clouds are beginning to darken the horizon in the form of opposition to the necessary further appropriations. The last legislature appropriated $50,000 for the work in the first section of the bill creating the sanatorium and the Commission to locate and build it, but in the 11th section of the same bill restricted the cost of the grounds, buildings and furnishings, to $25,000, so that the Commissioners find themselves handicapped by a paucity of funds, and try as they may, aided by the private benefactions of the citizens of Mt. Vernon, we will not be able to build more than two villas and possibly only one. It will be instantly obivous that we will be able to accommodate only 25, or possibly 50 patients to begin with, which fact alone is more than likely to create dissatisfaction among the physicians over the state, because each man who has an incipient case on hand, is going to feel that his patient should be admitted, as one of the favored few. As there will be at least 500 cases of that kind throughout the state at the time of opening the sanatorium, that we will now be able to build, this possibility is deplorable in our sight, for we are depending on the hearty cooperation of the state medical profession at large to secure the very necessary and much needed appropriations to complete the work now begun. The question that now arises with almost painful pertinence is: can the Commissioner or Board of Managers count on the loyal and unremitting efforts of the physicians throughout the state for their influence in the halls of the legislature when the proper time comes? It may easily be argued that the state now does, and has for many years, assumed the care of the hopelessly insane, both respectable and criminal, the epileptic, imbecile and feeble-minded, all representing a class of unfortunates from whom nothing can be or is expected in return for the service given, while the blind and deaf and dumb are provided with liberal assistance in preparing themselves for their limited usefulness to themselves or the community, while we have here a class of individuals consisting of the essence of the best brain and talent of society, for whom a permanent cure is promised and whereby 75 out of every 100 of those affected will, in a reasonably short time, be enabled to return to family and home and health and the pursuit of happiness, becoming bread-winners in this work-a-day world and heroes in the struggle for existence. They will be able to repay interest to the state in money and, best of all, achievements, all that she laid out for them when they needed it, with a sum, that contemplated in the perspective of five decades, would appear as a stupendous figure, almost beyond the comprehension of the human mind, if it were required to be paid *en masse*.

Besides the schools for the deaf and dumb and blind, the state also maintains other institutions similar in principle, but differing in details, and the Commissioners feel that if the matter should be presented in the proper light to the profession and

people at large, the proper appropriation will be forthcoming. We expect to begin building with the money we have as soon as the weather will permit; and the ceremony of the corner-stone laying is slated for two days in the third week in May. The Governor will be the principal speaker of the occasion. The presidents of the various state medical societies are to be invited to be present and make speeches, as well as other dignitaries deemed serviceable to the ends of the work in hand. The officials of the Frisco Railroad have kindly agreed to run an excursion train from St. Louis, with a minimum round trip fare, and all present here tonight and their families and friends are cordially invited to make the trip. To those who are acquainted with the Southwest and its wonderful resources, the trip will be a delightful vacation, but to those visiting it for the first time, it will be nothing short of a positive revelation. A slight intimation as to the wonder to be unfolded there, is a spring on the site and a finer one across the road, which pours out crystal ice water in great volumes the year around and the banks of the branch running from them, are lined with the most fragrant mint, while the white pebbly bed is covered with crisp and juicy water cresses. The hospitality of the people of Mt. Vernon is as cordial and warm as the redolent sunshine of that clime and the spirit of welcome as fragrant as the perfume of the flowery woods and green fields round about.

There will be a power house in which heat and electricity will be generated and a sterilizing room provided for infected clothing, laundries, and quarters for the engineer, etc. But the location of this building has not been formally determined on by the advice of the architect. He advises that instead of having it at the base of the chateau group, on the crown of the hill, it will be more economical and equally efficient, if it be located on the western boundary of the grounds in a valley, and near the railroad track, where a switch can be easily constructed to it, for the easy and cheap delivery of coal and supplies.

I have omitted until now, to state definitely that the Missouri State Sanatorium for the treatment of incipient pulmonary tuberculosis will be located on a tract of 197 acres of land, donated to the state by the citizens of Mt. Vernon, the County seat of Lawrence County. As regards St. Louis, it is inconvenient, but is not so difficult of access at the worst; it is within easy access from Springfield, Carthage, Joplin, Webb City, Kansas City and St. Joseph and a number of other small cities and towns, whose total population more than equals that of St. Louis and her environs. The elevation or altitude of the site, is about 1350 feet, the law requiring that it be not less than 1000 feet above sea level. It is to be watered by the town pump of Mt. Vernon, free of cost, and electricity for power and light are to be furnished by the town power house for five years, also without cost to the state. Free telephone service for fifty years is another consideration. The buildings when all are done, will occupy the

most of perhaps twenty acres along the south line of the grounds, which are now covered with a dense wood, but which is being thinned out under the personal supervision of our president, leaving the balance, which is now in cultivation, to be cultivated by the working force of the institution, for their own support. For we will raise our own poultry and gather our own eggs; will raise our own cattle and milk our own cows; and churn our own butter; will have our own orchard and raise our own peaches and apples; will have our own garden and raise our own strawberries, which are particularly luscious in this locality; will have a truck patch and raise our own sugar-corn and sweet potatoes; grow our own asparagus and celery, lettuce and onions, so that those who are fortunate enough to get into this asylum (in the highest and best meaning of the word) will be, if possible, more sorry to leave than they were to enter it. By this arrangement, the cost of maintenance will be much reduced, (nearly $5.00 per week) so that the cost to this state will be relatively small, as compared with the Eastern states. The average percentage of cures in other institutions of like character, but not so well arranged, is 70 per cent. of all cases admitted. With our advantages, we expect 75 or 80 per cent. of cures, but the largest benefit of the sanatorium will not be due to the work done in it, but to the teaching coming from it. Every patient graduated from it will be a harbinger for good in the community in which he lives, and the methods of precaution and sanitation practiced in the sanatorium will be diffused abroad, until the filthy habits of consumptives as now practiced will be supplanted by the simplest forms of sanitary procedure. Instead of concealing as long as possible their condition, as is now done, the patients will aid in the diagnosis instead of concealing it; the physician will be more encouraged to declare the diagnosis when made; wheretofore he has not always felt like so doing, because it has usually meant the announcement of the patient's doom. Through general educational influences, the disease must necesarily be lessened and finally exterminated, because not only of the ability to cure, but of the more potent ability of its general knowledge and the practice of prevention. While all these advantages have come out of an absolutely drugless management, I am one who is optimist enough to believe that when as much attention is given to the development of a scientific therapeutics as is given now to surgery, we will have cures of tuberculosis as much under our command and control as we now have diphtheria. It is quite evident even to the casual observer, that we are on the threshold of a great philanthropic movement which shall be limited only by the confines of the earth. In assuming the charge and care of the victims of consumption the state has embarked on a course of charity only possible in the light of twentieth century development and philanthropy.

The great pale face army that heretofore has yearly marched on to certain doom and physical destruc-

tion, is now brought to a halt on the brink of eternity by the bugle call announcing their emancipation from the thralldom of tuberculosis. The music swelling from the throats and exultant hearts of the friends and loved ones is no longer accompanied by muffled drums, nor has Miserere for its key-note. The song is now full of color and triumph. Exultation is the key-note and it reaches a crescendo in a grand diaphason of rolling drums and popular acclaim. Verde is replaced by Haydn, the spirit of Creation is substituted for that of melancholy and one can scarce repress the exclamation,

"Oh, Tuberculosis! where is thy victory?"
Oh pathology! where thy sting."

DISCUSSION.

Dr. William Porter:—The outlook is good. Twenty years ago we could not say that. Ten years ago the work had just begun. The statement has been made recently that at present rates in twenty years tuberculosis may be as unknown in Germany as is cholera, and in forty years it will be the same in England. The results in this country are owing to the quiet but potent influence of such men as Trudeau, the first president of the national tuberculosis association.

Flick and Bigg, at present rates one in ten will die of tuberculosis, in the "country, one in seven in our cities. In New York and Philadelphia the death rate has been reduced forty to forty-three per cent. Apply that in our own city and you will see the large number of lives saved. Multiply that by five and you will see what it means to our state. This is an economic question, also. According to statistics compiled in Illinois this disease costs that state over $35,000.00 a year. Now, if we can save 40 per cent. of these lives and this money, the work is a good one considered on economic grounds alone.

The state sanatorium is only one of the features involved in this enterprise. It is not alone a question of the great good that will accrue from it directly; the larger question is that of the education of the masses. In St. Louis we estimate that we have 5,000 cases of tuberculosis today. In our city and private institutions we can shelter only 1 in 50 of these. In our state institution we will have accommodation for only 24 or 25 or possibly twice that many for the next two or three years. Along educational lines is where the great work needs to be done and is being done today. Our medical journals are full of this one subject. Trudeau wrote me recently: "the great fundamental need is the education of the people." And we need education along this line in the medical profession.

But how are we to educate the people? Our society for the limitation of tuberculosis last month issued 300,000 little pamphlets touching on the essential conditions of tuberculosis. This state institution will be worth every year what it will cost for ten years to keep it up. If we save 40 per cent. of the people who are now bound to die of tuberculosis we will rob the grave yards. How will we do it? By the profession backing up this movement.

I believe the best way to support this commission is to give it our unbiased thought and when necessary our suggestions. It is our duty in the greatest fight ever made for the health and happiness of the people of our state. I think this little $50,000 is a sort of feeler. If this committee as our representative makes good use of that it will be no great trouble to get more money.

The control of the patients ought to be a large factor in the arranging of these pavilions. When you get one hundred patients, whether in the incipient stage or the advanced stage, it means a great deal of care. At Mount St. Rose we have the extreme cases also, but we find that the night and day service,the watching of the sputum cups, the cooking, etc., require much care and the amount of personal supervision is so large that sometimes I shrink from it. When these cases come to the state sanatorium they will come for months and longer. The cases that get well in a year are not the exception, while those that get well in two months are rare. They should not be discharged until the evidences of cure are certain.

We are well in advance of most of the western states but I hope that nothing will be done to limit this advantage. These plans are very attractive but if the charge should be brought that they are not as economic as might be it will be very hard to get an adequate appropriation.

Dr. Geo. Homan:—Dr. Porter has stated what appear to be the main objections one being the initial cost. If funds were available without further action on the part of the legislature this would be a very fair scheme, but it looks as if the first cost would be large and this may be used adversely by those who are not disposed to cooperate. I don't know that this society is in a position to do very much if the architect has fully settled these plans and they have been approved by the board. It seems obligatory by the law that the buildings be made of stone or brick. It was my impression that the buildings for patients' use might be of an inexpensive character. They might be made of frame and the cost minimized in that way. I suggested to Dr. Bayless, the president of the commission, some months ago the possibility of temporary shelter, simply frame and canvas structures, by which a number of patients might be accommodated. But I judge from what Dr. McElwee says that that is not feasible as the law reads. I presented a historical sketch of the movement which has culminated in this institution, at the Missouri State Medical Association last May which was read by title only. I would like at some future time to present this to you, and to briefly indicate the beginnings of this movement and those who were responsible for its success. Dr. Porter was one of the originators of the society for the prevention of tuberculosis here, and Dr. Lutz Porter, Funkhouser, W. G. Moore and myself were the members of the committee from this society which acted in conjunction with other societies in conducting the campaign which resulted in the creation of this state institution. The appropriation originally asked for in the bill was $100,000 but this was reduced to $50,000 and it ap-

pears that as the bill finally passed only $25,000 was made available for construction purposes. Instead of $50,000 only half that amount can be used for building and the commission is hampered to that extent in its plans.

Dr. James Stewart, Holstein, Mo.:—I am very glad to see this movement progressing so nicely. If I am fortunate enough to be returned to the legislature I will work hard for a greater appropriation. I think we need this institution and I believe we have the men in this state to take care of the institution. I pledge myself that if I am returned we will have a more generous appropriation than that we have already received.

Dr. Victor A. Bles:—I lived in Colorado for many years and I saw a great deal of tuberculosis. Of the men sent from the east in the first stage of tuberculosis, examination showed that in many cases they had no tuberculosis. Some things in these plans should be changed, other parts are very satisfactory. The great object is to obtain oxygen. While a high altitude acts as a tonic yet it later affects the nervous system. The cities as they grow are less desirable for tuberculous subjects and again, while the areas in the lungs heal rapidly, the climate is so trying and the air so irritating that we find many cases of tuberculosis of the larynx and these patients simply starve to death. The open air treatment is now much in vogue. I would suggest that these patients be given a great deal of air for sleeping as well as for work. The rooms should be built so that one portion may be taken out and, in very inclement weather, shut down or closed again. In the Oaks Home in Denver, there are three departments, for the incipient cases, the more advanced cases and the very bad cases. The herding of such patients is not a good thing. They sit together and compare notes on diet and doctors and haul out their thermometers. We all know the desire to live that is characteristic of these patients, yet that desire can be cast down by the merest suggestion, so I believe the cottage idea is better than to place any great number in one building.

Dr. L. H. Behrens:—I think in the city institutions as a rule they receive patients in the third stage almost entirely in other words, the larger per cent. who go there die. The ward method is all right there but I believe that the ward system of treating phthisis pulmonalis in the earlier stages is a curse. The plans are on the right idea but they could be simplified. We should demonstrate how many people we can treat with the money we have and the people will help us to get the necessary legislation for more. There is no comparison between our city tuberculosis sanitarium and the state sanatorium. This is to try to cure patients—a cure that will last. We should remember that the people who will go to those institutions are very poor. They are not accustomed to luxuries. If we sent them to a fine sanatorium they would not feel as much at home as if the place were more plain and besides we will get the same ultimate results, I am in favor of any system whereby we can do much for a great number of the unfortunates.

SYMPTOMATOLOGY OF PNEUMONIA.*

BY J. R. LEMEN, M. D., ST. LOUIS.

In no infectious disease do we have the initial symtom of chill so frequent as in pneumonia; even in malaria we have prodromes that lead us to expect the chill, whereas in pneumonia it comes on suddenly when the patient is apparently not greatly indisposed. After the chill the fever rises rapidly to 103-105 degrees, and this is accompanied with great pain, usually referred to the mammary region, but which may be located in some distant area. The pain is supposed by some to be due to pleuritic involvement but it seems probable that the inflammatory condition of the lung is responsible for this pain, as when the pleuræ alone are inflamed we kno wthat the pain is confined to or near the involved pleura. The dyspnea is great depending upon the extent of the lung area involved in inflammation and on the toxic effect upon the nerve centres. The respirations increase in number to 30, 40 or 60, the movements are restrained owing to pain, the expiration ends in a grunt. The pulse rate rises with fever, but not to the extent that occurs in other febrile diseases. The ratio between respiration and pulse is disturbed greatly in pneumonia, the ratio instead of one-quarter dropping to one-half, or one to two and one-half. This by some is considered of prognostic value. The pulse is usually accelerated but not to the extent that we find in other febrile diseases. The pulse is full and bounding at first, but may weaken under the increased pressure in the pulmonary circulation. The second sound is accentuated, owing to this tension, and we believe that herein lies one of the great dangers to patients with pneumonia, the pulmonary blood tension.

The cough is very painful, frequent, single, and dry, but on the second or third day the patient may commence to expectorate the characteristic sputum. However, there may be such intense congestion that hæmorrhage will take place at the beginning of the attack. Cerebral disturbances are common and the patients may become delirious. This is especially true in apical pneumonia, and the tendency to insomnia is often one of the most annoying symptoms that the physician has to combat. The fact that there is great tendency to herpetic eruptions is noticed, and may be of value in making the diagnosis as these eruptions are absent in other diseases of the respiratory organs. The blood feature is the leucocytosis, which may be enormously increased, and in those cases where it is absent the prognosis is grave; in two cases of a febrile pneumonia under my recent observation, in which the leucocyto-

*Read before the St. Louis Medical Society, meeting of March 3, 1906.

sis was very small, the termination was unfavorable. The urine is high in color and specific gravity, the chlorides, however,being diminished which is probably best explained by the Koranyi theory of molecular interchange in the kidney.

THE PATHOLOGY OF PNEUMONIA.*

BY LOUIS M. WARFIELD, M. D.,ST. LOUIS, MO.

With the advances in our knowledge of the infectious diseases, we have learned that the organisms producing these diseases, while causing local lesions in various organs, produce toxins that are transmitted by the blood stream to all parts of the body. It was a great surprise to learn that there could be such a condition as typhoid fever without macroscopic intestinal lesions, and although there are still some who, in their treatment of typhoid fever, seem to cling tenaciously to the idea that to cure the intestinal ulcers is to cure the disease, pathologists and most clinicians believe that typhoid fever is a constitutional disease with the lesions caused by the bacillus typhosus located primarily in the ilium. It was long before the idea that lobar pneumonia was a constitutional disease with local lesions in the lungs, replaced the old idea of a specific local disease. But the facts that have been brought to light leave no doubt that we must look on pneumonia as we do on typhoid fever, or diphtheria, or tetanus, etc. Man and the higher apes are the only animals that naturally are susceptible to pneumonia. The ordinary laboratory animals do not contract the disease, but by inoculation the typical lobar pneumonia can be produced. If a mouse, rabbit, or guinea pig is given a subcutaneous injection of the pneumococcus it rapidly succumbs to a generalized infection and at the point of inoculation certain changes occur depending on the virulence of the organism. In dogs, rabbits, and large animals, pneumonia with local lung lesions can be produced by injection into the tracheæ or lungs of cultures of pneumococci. Apes in captivity are very susceptible to pneumonia and many have died that have contracted the disease in menageries where the temperature variations have been great. Pneumonia is a disease that shows striking peculiarities in its season occurrences. It is wide spread and wherever encountered it has been found that the months during which there are much dampness and sudden changes in temperature are those showing the greatest number of cases. That it is a very fatal disease no one will deny. In hospitals, the percentage mortality is found from 20 to 25. This is somewhat lower in private practice. Since the pandemic of influenza several years ago it has seem-

*Read before the St. Louis Medical Society, meeting of March 3, 1906.

ed that pneumonia is on the increase. Probably the lowering of the bodily resistance by the influenza has been largely responsible for its increase. That the old idea of cold and chilling the surface as factors in determening the onset of pneumonia must be acknowledged,are shown by some experiments conducted by Lode. He found that when animals were shaved, kept for a time in a warm place, then transferred to ice water or cooled rapidly in a draft, and a culture of pneumococci then injected, these animals succumbed in 24 to 48 hours, while control animals which received only the injection remained well. Guinea pigs which had been treated this way and had then received inhalations of cultures of pneumococci perished in two or three days from double pneumonia with hepatization.

Since Sternberg, of Washington, in 1880, discovered that there was a something in his sputum that, when inoculated beneath the skin of a mouse, killed it in 24 to 48 hours, a great mass of research work has appeared. To Frankel belongs the credit of publishing first his researches and of showing beyond doubt that the coccus that caused the death of the mouse was the same that caused acute lobar pneumonia in man. This organism, called by him *diplococcus lanceolatus*, fulfills all the postulates of Koch, and thus can be said to be without doubt the cause of the disease in question. Pasteur and one or two others in France discovered the toxicity of the saliva about the same time that Sternberg discovered it. This is however not the only organism concerned in this disease. Friedlaender in the 80's described a short, thick bacillus that he found in cases dying of what was clinically lobar pneumonia, and for a time there was much confusion between this and the diplococcus lanceolatus of Frankel. However, later researches,have shown that the two are different bacteria and that, while the so-called pneumo-bacillus can and does produce typical lesions of lobar pneumonia, it is a comparatively rare cause.

Recently, Schottmueller, (*Munch. Med. Wochshft.*, July 25th, 1905, has described six cases of typical lobar pneumonia in which he found the *streptococcus mucosus* in pure culture in the blood, and in one it was also found in pure culture in the pus of an empyema. In the other five cases the organism was found post-mortem in the lungs and other organs generally in pure cultures. While this discovery apparently adds another etiological factor to our list, it will be shown later that such is probably not the case. The most important and complete work that has thus far been published, has recently been done by those working in connection with the Pneumonia Commission of the New York Board of Health. It seems very pertinent to give in brief a summary of the work as it has an important bearing on the pathology of the disease. These studies were made on the pneumococcus by men in several cities, then sent to New York, where they were all studied critically by one man. On the whole the results were more uniform than might have been expect-

ed. They confirmed work that had been previously done and added some interesting observations on the presence of the pneumococcus in the sputum and throat secretions of healthy persons and of those ill with pneumonia, besides settling the question of the unity of the pneumococcus and its relation to the streptococcus and to the streptococcus mucosus.

The conclusions of W. H. Park and A. W. Williams (*Jour.-Exper. Med.*, 1905), in a study of 200 cases may be given in full. They found that typical pneumococci were present during the winter months in the throat secretions of a large percentage of healthy individuals in city and country. That a higher percentage of typical strains of pneumococci has been obtained from healthy persons than from those suffering from pneumonia. In the latter cases the atypical strains may have been overlooked, because of the larger number of pneumococci present. Many of the atypical strains seem to be closely related to the streptococci. That the so-called streptococcus mucosus (Schottmueller) which has been hitherto classed with the distinct streptococci, is placed as a definite variety among the pneumococci, and it is recommended that the name be changed to *streptococcus lanceolatus var. mucosus*. It is this conclusion that throws doubt on the cases reported by Schottmueller of the discovery of a new cause for pneumonia. It would seem that the organisms that he found were atypical pneumococci or rather a variety of the typical pneumococcus. Further, Park and Williams say that a lower percentage of strains of pneumococci virulent for rabbits in the doses used has been obtained from normal cases by rabbit inoculations of mass cultures than from cases of pneumonia by the same method. That since the virulence of pneumococci may be rapidly increased for a susceptible species of experimental animal by successive passage, and since the pneumococci obtained from most pneumonias are more virulent for experimental animals than are those obtained from healthy individuals therefore the virulence of pneumococci from cases of human infection is probably increased for human beings, hence, cases of pneumonia should be considered to be to a certain degree contagious, and since the virulence of the pneumococci may be quickly increased, and since the organism is very prevalent in normal sputum, all possible measures should be taken to restrict public expectoration.

That by repeated inoculation into sheep of a pneumococcus strain, a specific protective power of this serum for mice is developed against the homologous strain and against certain other strains, one morphologic variety (*streptococcus lanceolatus var mucosus*) being thus differentiated from other strains.

The natural habitat of the pneumococcus is in the throat secretions of man. Although it has been found in the dust of a ward in which pneumonia patients were, it is doubtful if it would survive long outside of the body. Thus, F. C. Wood studied the viability of the pneumococcus after dying and came to the con-

clusion that the life of the pneumococcus in moist sputum is of considerable duration, the average period being somewhat less than two weeks, unless the material is exposed under direct sunlight. The dried sputum masses retain their virulence for a long time, 30-35 days in the dark; and sweeping, dusting,or brushing the contaminated articles will distribute pneumococci in the air. The organisms in the sputum do not remain long in suspension and die off rapidly under the action of light and desiccation. In sunlight or diffuse day light the bacteria in such powder die within an hour, and in about four hours if kept in the dark.

Wood also believes that when a patient coughs, expectorates or sneezes, particles of sputum or saliva which may contain virulent pneumococci are expelled from the mouth. Such particles remain suspended in the air for a number of hours if the ventilation of the room is good. They may be inhaled or deposited on articles in the room. However they become harmless in less than an hour and a half, while many pneumococci in the spray perish in a few minutes if exposed to strong light. Longcope found that a 24 hour bouillon culture of a pneumococcus taken from a stock culture that had been kept for one month at 10 degrees C, killed a rabbit when only .0001 cc was used. This was the original. M.L.D. His's most virulent cultures came from cases of empyema and from the cerebro-spinal fluid in cases of meningitis. Attention has been directed in recent years to the contagiousness of pneumonia. For some time from the pens of writers all over the world have some records of undoubted cases of pneumonia contracted by contact with a patient suffering from this disease, and indeed ward epidemics of pneumonia have been reported. From the work of Wood cited above it is not surprising that such cases do occur. As a rule, pneumococci from a patient ill with pneumonia are more virulent than those from the throat secretions of a healthy person. In number they are far greater, the favorable soil then is the only necessary factor to produce the disease. It has been stated that pneumonia should be considered as a general infection with the pneumococcus. In proof of that statement many observers have found the organism in the circulating blood in pneumonia patients. Prochaska, Cole, Kinsey and others have been successful in the cultivation. The writer has also succeeded in recovering pneumococci from the blood in a few cases. The most successful results are obtained by using flasks of bouillon or litmus milk thus diluting the blood many times. Kinsey states as a result of his studies that the finding of the pneumococci in the blood, has no prognostic value but when they occur in large numbers the case is as a rule severe. No investigator has found the organism in every case examined.

From the time of Laennec pathologists have been in the habit of dividing the morbid anatomical changes of lobar pneumonia into three stages. (1) The stage of acute congestion or engorgement; (2). The stage of red hepatization;

(3). The stage of gray hepatization. It is not purposed to describe these stages that are so well known and so well described in text books. The attempt rather will be made to pick out interesting points that have in recent years been worked out. The infection of pneumonia is caused by inhalation of the pneumococci. Having found in the alveoli conditions favorable to their growth they multiply and produce their toxins. The infection usually travels rapidly by means of the blood and lymph channels over a large part of a lobe, a whole lobe or several lobes. Frequently what is known as "creeping pneumonia" is seen. In these cases the infection attacks in slow succession several lobes instead of being confined to one lobe, or affecting several lobes almost simultaneously. It is possible for the infection with the pneumococcus to begin around the fine bronchioles as a bronchopneumonia, but such a state is not of long duration and the process rapidly assumes the lobar as opposed to the lobular type.

It is interesting to note that the right lung is much more frequently involved than the left lung, and two lobes of a lung oftener than a single lobe. The greater frequency of the infection of the right lung is probably due to the larger size and more vertical direction of the right bronchus. Of 489 cases (Steven, Sturges and Caupland,Osler and 125 cases seen by the writer at the Johns Hopkins Hospital in the two years from 1900-1902) the right lung was affected alone in about 50 per cent. of cases, the left lung alone in about one-third of the cases. In the stage of congestion the capillaries are distended with blood and blood cells by diapedesis fill the alveoli. The lung is swollen and firm, red and beefy looking.

Pratt (*Contrib. to Sc. Med. by pupils of W. H. Welch*) found in the early stages of red hepatization large non-granular cells with nuclei not unlike the nuclei of the transitional cells of the blood. These are phagocytic and in them are seen polymorphonuclear leucocytes, red blood corpuscles, detritus. In a case that died eleven hours after onset where only red hepatization was found, no polymorphonuclear cells were seen in the exudate, only these nongranular cells were found. These cells are probably derived from the alveoli which are lined with endothelium (Mallory). In cases dying after the third day, the polymorphonuclear leucocyte was the predominating cell. The large phagocytic cell with vesicular nucleus which is certainly derived from the walls of the alveoli was found in nearly every case. Mitalic figures were seen in the alveolar cells. After the ninth day desquamated epithelial cells were found in the exudate in large numbers. Lymph cells, plasma, red blood and pigment carrying cells were constantly found. The fibrin is not secreted from the alveoli, but derived from the blood and is more abundant at the periphery of the alveolus than at the centre. The interstitial tissue is usually normal in appearance until late in the disease. It is then seen to be infiltrated with plasma cells, a fibrinous exudate is found in the stroma and often the

cells of the connective tissue were swollen and the tissue was oedematous. Thrombi were frequently seen in the smaller vessels and in the capillaries. Emboli composed of giant cells from the bone marrow were frequently found. Ribbert attributed the anemic color of the lung in gray hepatization to wide spread thrombosis. Pratt believes that both compression of the blood vessels and the thrombosed condition of many are the causes of the gray color rather than the substitution of white cells for red cells in the exudate, a view advanced by Aufrecht.

The lymphatics are involved late in the disease. There is proliferation of the endothelium and distension with cells, serum and fibrin. Death may occur at any stage of the morbid process, although usually the lung reaches the stage of gray hepatization and even partial resolution. But death may occur in the very early stage of red hepatization (*vide* Pratt).

In cases dying of uncomplicated lobar pneumonia there are rather constant lesions in other organs due in all probability to the toxins of the pneumococcus. The spleen although rarely clinically enlarged is the seat of cloudy swelling. Likewise the liver is in the majority of cases slightly enlarged and shows parenchymatous degeneration. There may be intense nephritis or only a mild degenerative condition of the tubules and frequently macroscopically cloudy swelling is seen. Longcope, in a recent article (*Bull. Ayer. Clin. Lab.*, vol. 2, Jan., 1905) has found changes in the bone marrow of patients dying with pneumonia, that are quite constant. These changes consist in more or less extensive hyperplasia of the blood-forming cells, with a marked relative increase of the granular myelocytes, over the lymphoid cells. These changes were characteristic of all the cases he examined where a leucocytosis was present, e. g.: peritonitis, acute cerebrospinal meningitis, retroperitoneal abscess and puerperal septicæmia, besides the cases of acute lobar pneumonia. Accompanying every pneumonia, in fact a part of the morbid condition, is inflammation of the pleura. This may be from the slightest loss of the normal glistening appearance to the most intense fibrino-purulent exudate. Abscess in pneumonia is rare, one case in 125, but pus in the pleural cavity (empyma) and between the lobes is unfortunately not uncommon. The pus is thick, creamy consistency, yellow to greenish, yellow in color, and may almost completely fill one side of the chest. In pneumonia of the left lung where the process is in the anterior portion there is usually an infection of the pericardium by contact. Fibrinous, sero-fibrinous or purulent pericarditis may ensue, the latter being a very fatal complication. Of 125 cases seen by the writer, 4 had pericarditis and all died. In every case the left lung was the seat of disease.

Endocarditis.—Lesions of the heart valves are not uncommon and may be primary in a healthy valve or secondary on an already diseased valve. Myocarditic changes are always found. They consist in rup-

ture of fibres and infiltration with round cells.

Meningitis.—This is an uncommon complication but a very fatal one. The meningitis may be primary or secondary to an already existing pneumonia. In either case there is found thick pus over the convexity of the brain from which the pneumococcus can be grown. The wild delirium that sometimes occurs is not due to any meningitis but to the action of the pneumotoxin on the cerebral cells. Councilman, Mallory and Wright state that the meningitis caused by the pneumococcus is on the convex surface of the brain rather than at the base where the lesions of the diplococcus intracellularis occur chiefly.

Peritonitis.—This may be primary or secondary. Primary cases are usually in children and the prognosis after operation is good.

Arthritis.—Cave, Cole, and Campbell Howard have studied this complication. Cave reported 31 cases to which Cole added 11. Cole makes two groups of cases, (1) cases appearing as sequelæ or complications of acute lobar pneumonia, (2) cases preceding or occurring independently of acute lobar pneumonia. The condition is rare no case occurred in the 125 cases referred to above. The larger joints are the ones usually involved, though smaller joints are not exempt. Usually more than one joint is involved in a given case (13 out of 41 cases). Joints already the seat of a chronic affection are most likely to be attacked. The effusion is usually purulent but may be serous. The mortality is high, 28 out of 41 cases Salpingitis, otitis media, parotitis and keratitis are occasional complications.

Thrombosis of veins.—This is an interesting and rare complication. Sears and Larrabee in 949 cases found it only 10 times. There was one case in the 125 cases of the series quoted.

W. R. Steiner (*Bull. Johns Hopkins Hosp.*, vol 13, 1902) has recently reported 3 cases and reviewed the literature. He found 38 cases reported. He says that in view of the fact that the blood during an attack of pneumonia is rich in elements necessary for clotting the very few cases on record is surprising. The condition usually occurs late in the disease even after the temperature has reached normal and the patient seems on the road to recovery. The veins of the leg are affected exclusively, the left more often than the right, and the usual symptoms of oedema, pain and swelling with the cord like condition of the thrombosed vein are present. In the cases that recovered, the function of the leg was not impaired.

Pathology of the crisis.—After a varying period of high temperature and severe illness, with no change in the physical signs there is a sudden fall of the temperature and relief of the dyspnoea accompanied by a drenching sweat. In 486 cases studied by John McCrae (*Amer. Med.*, 1904) 226 (60 per cent.) ended by crisis, 116 (28 per cent.) by lysis. In 48 (12 per cent.) cases the fall of temperature was atypical. After the crisis the urine becomes more abundant, richer in urea. The chlorides that have been much di-

minished or even absent during the disease are increased. The toxicity of the urine likewise undergoes a rapid modification. According to Rayer and Gaume (*Revue de Med.*, 1889) this during the attack is below normal, but, when the crisis occurs, it increases markedly in toxic powers. Possibly the sweat also becomes toxic and contains effete products. The leucocytes, that during the attack are increased in number, (a marked leucocytosis being a favorable prognostic sign) suddenly return to normal.

The exudate in the lung rapidly dissappears by absorption. None is coughed out.

Flexner has found a leucocytic ferment which rapidly autolyzes the leucocytes of the exudate and renders them easily absorbable by the blood and lymph. Even after the crisis virulent pneumococci can be proven from material obtained by puncture of the lung, although most cultures from the consolidated lungs of cases of lobar pneumonia showed a rather low grade of virulence. (Park and Williams). Most pathologists believe that the crisis is brought about by a neutralization of the pneumotoxin by anti-pneumotoxin. It is probable that the leucocytes play some part in bringing this about.

Tchistovitch, (*Annales de l'Inst. Past.*, 1904) thinks that active phagocytosis by the leucocytes is the important factor. Pneumococci not only grow in immune serum but retain their virulence. He has found that in cases that recovered there was active phagocytosis whereas none was observed where there was a fatal termination. At the time of the crisis the blood of the patient has no bactericidal properties. He would explain the crisis by the engulfing of enormous numbers of cocci in the diseased lung by the leucocytes. The parts played in the defense of the host by the agglutinins, antitoxines and other substances are secondary.

The fatal termination in lobar pneumonia can be referred to two causes, either (1) respiratory insufficiency terminating in asphyxiation or in exhaustion of the respiratory centre, or (2) circulatory insufficiency which leads presumably to accumulation of the toxic agent, and which may induce oedema of the lungs, or end in exhaustion of the heart muscle. In the majority of cases the respiratory function suffers most from the action of the toxic agent, and the deficiency in O and the accumulation of CO_2 in the blood asphyxiates the patient.

TREATMENT OF PNEUMONIA.*

BY W. G. MOORE, M. D., ST. LOUIS.

Unfortunately we inherit the fallacies as well as the facts of our predecessors in all the walks of life. It is particularly true and particularly regrettable in the practice of a vocation where we deal with the lives of men. Remembering the bad practice which I have seen and which exists today in many quarters, I am constrained to write of the "don'ts" rather than of the "dos" in the treatment of pneumonia.

That it ranks first of the acute diseases as a life destroyer is sufficient excuse, were any needed, for making an honest effort to solve the problem of the most beneficial treatment in this affection. It is susceptible of more harm being done in a short time by injudicious measures than any other disease I know of, and in the shortest possible time. The amount of good to be accomplished by proper treatment is certainly great.

We are dealing with an acute infection whose pathological condition from the very beginning diminishes the actual breathing space in the lungs by filling the air vesicles with plastic exudate, and at the same time the toxic effect of whose presence is overwhelming the vital centers. Thus the oxygen by which we live is limited and the heart by which it is distributed is enfeebled in its functional office. The micro-organisms causing this pathological state have a definite period of activity lasting ordinarily from three to ten days—generally about eight days. A crisis marks the cessation of their invasion. We are therefore limited to from four to eight or nine days to do what we deem best for the relief of pneumonia, provided it runs an uncomplicated course. Clearly the task before us is to eliminate the toxines as quickly as possible and restore the pulmonary vesicles to their integrity.

Until we have an antidote either in the form of a serum or a drug which will destroy the bacteria and stop the pathologic and toxic progress, we must depend upon our ability to reinforce the constitution of the affected persons so as to enable them to outlive the unwelcome invaders of disease. How shall we do this? First, by making the hygienic conditions as good as possible, let in all the oxygen and sunshine we can, and use pure water internally, externally and eternally, as the best antipyretic, the best diuretic as well as the best diaphoretic and eliminant known to us.

The feeding of toxic patients is indeed an art, the great importance of which, I fear, is not fully appreciated amid the ceaseless din made by the commercial venders, as they cry aloud the virtues of some canned

*Read before the St. Louis Medical Society, meeting of March 3, 1906.

or bottled preparation of food that is but a delusion and a snare to the feet of the unwary. Why should any man advocate some prepared form of beef, when the fresh meat can be made into soups or served as desired? Is any form of albumen superior to the fresh egg? Or can milk be treated in any way to increase its efficiency over its fresh, pure form? Given meat, eggs, milk and farinaceous food, in the form of good bread, you have the real pillars of nutrition and, when supplemented by alcohol, *all* that is necessary for the support of pneumonia or other septic conditions.

It is in the judicious use of these remedies, both as to quantity and time of administration, that much of their value lies. Many patients through injudicious nursing are so over-fed by the direction of the attending physician that they are robbed of sleep and their respiration further embarrassed by the upward pressure of an over-distended stomach. How often have we seen the discharges filled with quantities of curdled milk and yet the stuffing process which brought it to pass went on unabated.

A good trained nurse is invaluable in the treatment of pneumonia, one whose judgment recognizes the good and bad effects of the proper or improper use of foods, and whose sympathy and perception are equal to the task of keeping the mental as well as the physical hygiene of the patient at the best possible status. The depressing effects of long-faced, whispering visitors, supplemented by darkened rooms and poor air, cannot be overestimated as depressing factors in the disease. Cheerfulness, hopefulness and sunshine are great aids to living, both in disease and in health, in animals as well as in men. So much for the hygiene and feeding of pneumonic patients, which represent the best part of the treatment for their relief.

Now, as to medicinal agents and others. How stale, flat and unprofitable would it be should I consume your time and try your patience by recounting the manifold treatments of the so-called distinguished men and self-constituted authorities who have written so dogmatically upon the treatment of pneumonia and pointed with pride to statistics which were due more to the type of disease prevailing than to anything advocated in the treatment.

It is not of such that I care to speak, except to point a moral, but rather of the clinical masters of to-day, and of them very briefly. Without exception, so far as I remember, the best clinicians agree as to the value of strychnin, digitalis and strophanthus, as well as nitroglycerine for their sustaining powers on the heart. They are all likewise agreed as to the unsatisfactory results from antitoxic sera up to the present time, and I believe my statement is within the bounds of truth when I say that a large majority of representative clinicians recognize the food value of alcohol in pneumonia as well as in other acute infectious diseases, while they deprecate the use of the large depressing doses formerly resorted to and held to be curative by some of the aforesaid authorities.

Testimony similar to that which was once accorded alcohol is now being thrust upon digitalis. Osler quotes Pētresco who gave one to two drachms of the powdered leaves at a dose and claimed that these colossal doses shortened the duration and diminished the mortality of the disease. Personally I expect digitalis as a therapeutic factor in pneumonia to meet the same fate as alcohol, i. e., to preserve its place as a valuable aid in sustaining the heart, but lose all pretensions as a specific.

As regards the use of oxygen gas, Osler doubts its real value. The work of Lorrain-Smith indicates that under certain circumstances it may be positively harmful. He has shown experimentally that actual inflammation of the lungs may be produced by the inhalation of this gas. Anders, on the other hand, says: "Oxygen, if freely used, often serves to tide over periods of marked cyanosis."

The pain of pneumonia as well as the cough is best controlled by the use of morphia hypodermatically, ⅛ to ¼ grain, and the application of ice bags to the chest. It is rarely necessary to use it longer than the first forty-eight hours for either purpose, during which time no remedy is so useful.

Delirium should be treated by injections of small doses of morphia and the ice cap, as well as frequent sponging with cool or cold water while the same is given by the mouth freely.

Poultices — our time-honored friends—are to my mind detriments rather than aids to the recovery of pneumonias. The fatigue and disturbance incident to their use are much dreaded by me, as I recall the half-conscious, cyanotic patient held by the arms, more dead than alive, awaiting the application of a remedy whose usefulness I do not recognize and whose scientific claims I cannot appreciate. Rest, absolute rest, body and mind, to the patient with pneumonia, is of the first importance.

To epitomize:—Pneumonia is a self-limited, acute infection, for which we possess no remedy approaching a specific. The best agents to support the heart are strychnin, digitalis and strophanthus in the order named. The best general stimulant, I believe, is coffee. The best anodyne, cough sedative and remedy for both thoracic and cerebral pain, as well as delirium, is morphia. Calomel, salines and the free administration of water as above indicated, and also by the subcutaneous injection of normal saline solutions are the best means for eliminating the toxines present.

In a few rare cases where the subject is unusually plethoric, venesection at the beginning of the attack is said to be useful in allaying the pain, relieving the dyspnœa and cerebral symptoms. Osler says it is more in vogue in recent years than for some time past and gives his approval to the use of it in suitable cases, yet I cannot believe there is any marked tendency to revamp this bloody practice. Anything which depresses the vital resources in pneumonia, as in every septic state, is to my mind contra-indicated.

I cannot leave this subject with-

out placing my hearty disapproval upon the criminal practice which obtained in the past few years with a certain class of physicians whom I will call antikamniaists—"afraid of fever"—who are always ready to resort to the use of these depressing coal-tar products to combat the fever and kill the patients. If there is an absolutely indefensible practice it is this, and I truly believe it has been the cause of many fatalities that would not otherwise have occurred.

What I have written applies to the treatment of lobar pneumonia without complications, which I take it was the scope of the subject assigned me.

DISCUSSION.

Dr. F. Neuhoff:—While I think the principles of the treatment as set forth by Dr. Moore will probably be agreed to, still I think our medical textbooks as well as our medical teachers are inclined to be too pessimistic in regard to the treatment of pneumonia. For the past fifteen years I have been in a position where I have had to treat thirty and thirty-five cases of pneumonia each year in one of the large hospitals here and we all know that among hospital patients the cases are of the worst class. So I may say I have had opportunity to see many cases of pneumonia in its worst form, where the treatment could be carried out in its strictest form. When I first undertook the treatment of these patients I was very much under the impression that Dr. Moore is now, i. e., that there was nothing in particular to be done and perhaps, as Osler says, we are more apt to do harm than good. But I have somewhat changed my views. I don't think there is any specific, but there are general remedies. If we use carbonate of creasote, ten minims every three hours, for every patient with lobar pneumonia, together with the hygienic measures mentioned, I think the death rate will be decidedly lessened. I would like the gentleman to try this. I don't believe in giving it in an emulsion,but give it in capsules until the fever goes down and you will have better results. As far as stimulants are concerned, the most important thing is to know when to give rather than what to give. If given too early they do more harm than good. This is true particularly of digitalis. The safest of all heart remedies, safe because if you give it a little too early you will do less harm, is strychnine. I believe that at the first sign of weak pulse, you should give 1-30 of a grain every six hours, then every four hours, then every three hours, providing the increasing weakness of the heart demands it.

If strychnine alone does not control the pulse, I add to that, 10 minim doses of the tincture of strophanthus (old pharmacopeia). If the heart still need further stimulation, I give besides the above, also whiskey. The safest way is to start in with one dose and observe the patient. I give an ounce of whiskey and watch the patient, if his comfort is improved I know I am on the right track, and give a table-

spoonful every six hours and then increase that later if necessary. One important point I wish to speak of is bleeding. Most people think it is a good thing at certain times, but they don't do it. I venture to say that of the entire number of men here tonight not one in ten has bled a patient for pneumonia. One year I bled all those patients that I thought proper cases. It certainly relieves the symptoms, but as to the ultimate recovery I think it did not affect the statistics. The cold air treatment I have read of with interest. Dr. Northrup reported the case of a boy during the whole course of his pneumonia placed in a room at a temperature of 40° between two open windows. No medicine was given the boy, and he made a good recovery. At the Presbyterian Hospital in New York all the pneumonia patients are sent up to the roof for four to six hours a day. I have not tried that, for I can hardly convince myself that to put a patient into such a temperature cannot be dangerous. I would like to see further reports before trying it.

Dr. Victor A. Bles:—Some of the years I spent in Colorado I was at an altitude of 8,500 feet and some of my work was another 1000 feet higher. I have been much interested in the article written by Dr. Galbraith of his experiences in Mexico where he treats pneumonia by the use of large doses of quinine, the initial dose being 50 to 75 grains. I never tried that treatment but I wish I had, for they used to die like flies, as the lessened atmospheric pressure increased the internal pressure at such a tremendous rate. My experience was that we could not give digitalis and it was the same with alcohol. The only stimulant we could give was strychnine. In fact, the indication was to depress rather than to stimulate the circulation. Oxygen did good where we could get it. I lived in a place where there was no nurse and not even a dentist, so you can imagine the assistance a doctor had in treating pneumonia. Down here we can follow a more expectant treatment but there one certainly could not sit still and wait.

Dr. K. W. Millican:—I have failed to find in any of the textbooks mention of a peculiar characteristic of the temperature in pneumonia, viz., the sensation to the touch resembling the feel of hot sand. My attention was called to this clinical feature during the course of my student days, I think by Sir William Broadbent. So marked has this character been in my experience that that symptom alone has more than once led me to suspect lobar pneumonia. On two occasions I bled a patient with considerable immediate relief. Both patients were very plethoric and the heart was greatly embarrassed. Both recovered; but, beyond warding off impending danger, I should not like to express an opinion on the influence of the venesection on the ultimate result.

Dr. Lemen:—One point I want to make in regard to Dr. Moore's treatment and that is his idea as to morphine. I think we should be very careful about giving morphine in a disease like pneumonia, where the vital forces are reduced, where the

respiratory center is likely to be sluggish, and therefore I believe that the administration of morphine is a dangerous proceeding in pneumonia. Other drugs will subserve the same purpose, quieting the pain and being less dangerous to the patient than morphine.

Dr. Moore:—What are they?

Dr. Lemen:—Bromide of sodium for instance.

Dr. John Zahorsky:—In regard to the etiology, I have observed many epidemics in children, especially in asylums. These epidemics often occur in asylums and in addition to pneumonia we have other affections of the air passages, otitis, coryza, bronchitis, etc. For many years I have been studying what other infections are found in families where there is pneumonia. I am convinced that this same pneumococcus may be found in the respiratory tract of other children suffering with bronchitis or some other infection. So it has occurred to me that possibly croupous pneumonia may be only an incident in a more or less wide-spread pneumococcus infection. I believe in that respect the histories of our cases are not complete. So it is erroneous to say that pneumonia is generally contagious; it is contagious but it would be more truthful to say that respiratory infections are contagious. We know that in health it is only in the upper air passages that the pneumococcus is found. Now, in these other children, in whom coughing is excessive, large numbers of the pneumococci may get into the lung and cause a croupous pneumonia. As to the treatment in infants and children it is the nutrition that counts. That does not mean that they should be given large quantities of food; we must find what they can easily digest and then give them only as much as they can digest. Again, those children fed on sterilized and canned foods have not the resisting power of those children fed on fresh eggs or milk. I would rather give a child much smaller quantities of fresh beef juice, eggs or milk given fresh, than large quantities of canned goods, such as the peptonized milk, etc.

Dr. J. H. Tanquary:—I agree with Dr. Moore's treatment in the main but think he might have put more stress on the early treatment. We are called in when the patient is vomiting, and has a temperature of 103° or 104° and I think we should first prepare the patient for stimulation by opening the bowels well. During the stage of congestion, with high fever, when the arterioles are contracted, an old remedy may be used to good advantage for a few hours. After moving the bowels well, after a few hours veratrum viride will dilate the arterioles and allow the blood to escape from the congested lungs. Of course, this is an old remedy and we are inclined to pay but little attention now to old remedies. I have seen good results from thirty and forty grain doses of quinine and I think I have checked the progress of the disease by giving this remedy. I agree with Dr. Lemen in the main that morphine should not be given recklessly, but I believe with Dr. Moore that the pain may be allayed by a small dose of morphine occasionally

and the patient greatly benefitted by a few hours of rest.

Dr. A. R. Kieffer:—It is a very sad commentary on our methods that the mortality of this disease increases with the advance of knowledge in medicine. The mortality being 20 to 25 per cent. in the hospitals, where there is the greatest knowledge and the best opportunity for putting this knowledge into practice. I remember that in the country where malaria was common there was a great fatality among pneumonia cases. It was a common practice there to begin our treatment of pneumonia cases with malarial treatment. The patients are taken suddenly, with a full alimentary canal. I gave first a large dose of sulphate of magnesia, which had practically the same result as freely bleeding the patient, and I followed this up with large doses of quinine. Pain is a prominent symptom of the first stage. It is not prominent after the stage of hepatization. There is no harm in giving morphine cautiously in the early stage. It was my habit to use a many tailed bandage in the early stage, but I do not believe it would be advantageous in the later stages. As to expectoration, many patients do not expectorate at all. In cases where it is marked the objection to morphine is the blunting of the sensibility, preventing the cleaning out of the bronchi leading to healthy lung.

One point I would like to have some light on and that is the question of stimulating the heart. The greatest skill in the treatment of pneumonia is needed right here. Take, for example, a driver who begins to whip his horses at the foot of the hill. The team is exhausted before he gets to the top. I think it is better to watch the heart and as long as it is able to carry the load don't stimulate it, but when it begins to lag stimulate. Right here is where I think many practitioners make mistakes. Many a patient dies because his heart is whipped to death. I don't know what the mortality is in the country but it is small except in the extremes of life. As to the spread of the infection, I think those sulci are put in the lungs to prevent the spread of the disease. But in the grip type of pneumonia there is little attention paid to these sulci in the spread of the infection. As to its contagious character, I remember one family in which three members had the disease at the same time. I knew of a family having eight cases of grip at same time. In one family a child had an attack of acute lobar pneumonia, then the mother, and later the father. In another instance a man had pneumonia, then his son and his son's wife, and all three died.

Dr. E. C. Gehrung.—I have listened to these three most valuable papers with the greatest interest. We may feel proud of the progress that has been made in the symptomatology, pathology and treatment of this protean disease. Strange to say however, that the mortality has not lessened, but seems to have increased *pari passu* with the progress of science. This would point to the need of a little less science and a little more common sense.

Whatever the kind of pneumonia and whatever the pathology, wheth-

er septic or not, certain indications for treatment constantly present themselves. Free expectoration, relief of pain, aeration of the blood, sleep and rest, reduction of temperature, nutrition to keep up the strength of the patient to resist the disease and to prevent if possible the unpleasant and dangerous sequellae. These are to my understanding the indications for a successful treatment of pneumonia. Besides the treatment indicated in the papers read to-night, to reach this result, there is one means,which, without interfering with the others, will meet every one of the aforementioned indication. Forty-two years ago, when assistant at the merchant marine hospital, I had good opportunity to observe how pneumonia patients on waking up clutched their chest to relieve the pain of unguarded breathing and coughing, and I wondered whether something could not be done to overcome this suffering, by mechanical or automatic means. Later, when in private and general practice I encountered plenty of opportunity to bring my idea into execution with most satisfactory results. My treatment was as follows:

Strip the patient's chest, wash, dry and oil it, cover it with a thick layer of (preferably the best quality of unabsorbent) cotton, from the axilla to the lower edge of the ribs and over the shoulders, to keep up an even temperature, then cover the whole by a circular bandage, either a broad towel or a strip of drilling or sheeting fastened like the obstetric binder, or scultetus or roller bandage, or adhesive plaster, no matter what substance be used, so long as you strap the chest so tightly that all costal movement be arrested and diaphragmatic breathing be substituted for the thoracic. To do this it requires a considerable amount of force, to use which many lack the courage and thus defeat the very purpose for which the bandage is applied. Care must be taken that the bandage be applied along the line of the tenth rib to the sternum in front so as to leave the scrobiculus cordis free for the abdominal respiration. The bandage should be pinned in backstitch fashion with large safety pins and shoulder straps should be pinned or sewed to it to prevent it from slipping down. Whenever the bandage becomes loose and consequently all the symptoms return, it should be tightened again. The effect of this, as the chest walls do not give, is free and painless expectoration since every diaphragmatic succussion drives the contents of the respiratory tract to the surface whether septic or otherwise, thereby almost certainly avoiding the chance of infecting the well side, by preventing regurgitation into the healthy bronchi. The air can now come freely in contact with the respiratory surface. Breathing or coughing can take place, free of pain, since the chest can not expand to the pain limit and the additional irritation of the diseased tissues is thus prevented. The septic mucous will be promptly removed instead of having every chance to accumulate, propagate and re-infect the tissues with which it is in contact.

The pain being allayed, the respiratory tract cleared and as a rule the

temperature diminished, sleep can now be enjoyed without the fear of waking up in pain or suffocation. The appetite will soon return and give the patient additional strength to battle with the disease. Unless the chest is strapped to the extent of completely preventing the costal movements the bandage is useless. Many will lack the courage to accomplish the desired result, "because it appears so cruel to use the necessary strength," or "because they are afraid of limiting the breathing space, where the patient is already struggling for air." This is however false reasoning, as the preceding explanations will clearly show.

Reasoning from a limited experience during later years, as the exclusive practice of gynecology will necessarily do, I believe that under this "bandaging of the chest"—which acts much like a surgical splint to the diseased organ in addition to whatever other means be desired or desirable that at least fifty per cent. more recoveries would take place than under the present treatment. I also believe the sequelae, like hepatization, perforation, pleuritic effusions, etc., would be largely avoided and the duration of the disease greatly abbreviated.

I shall state here that I have never lost a case of pneumonia since the use of this bandaging where I was called before the patient was moribund, that I have never had the occurrence of a miscarriage when the patient was in advanced pregnancy, contrary to what happens to others and contrary to what happened to me before the chest bandage was used; that a few cases with double pneumonia during labor at term made an excellent recovery under much reduced suffering. Those who have, under my direction honestly and fully tried this my plan of treatment have reported equally favorable results.

The pain in pleurisy is almost always and immediately allayed by my "chest bandage." It usually renders all other treatment superfluous in this disease. At the same time it generally prevents the occurrence of the so much dreaded sequelae.

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EDITORIAL.

SALUTATORY.

With this number, the Journal of the Missouri State Medical Association closes its second volume. During the past year, twelve numbers have appeared with an average of 74 reading pages. Not only has the Journal published the transactions of the Association, which included all papers read at the Excelsior Springs meeting, but many articles or abstract of articles from the affiliated societies. Altogether 81 editorials, 215 county society notes,and 82 original articles have appeared. One fact has been demonstrated to the medical men of the State, that is the value of the State Journal in organizing and cementing together the medical profession of Missouri. Two years ago there were 1,221 paid members; 1905, 1,602 paid dues and 1906 will show a gain of more than 400 members. Beginning next year the Journal may be published at one-half the present cost and after three years will be self-supporting. The success of the Journal should be a source of satisfaction to all members of the Association.

ANNUAL MEETING.

The forty-ninth Annual Session of the Missouri State Medical Association was held May 15th, 16th, 17th, at Jefferson City. The weather was perfect, sky was clear, and the temperature very comfortable. The attendance proved to be a large one and both the House of Representatives and the Senate Chamber were well filled. The House of Delegates and Judicial Council met Tuesday morning at 10:30 o'clock, and the entire day was spent in routine business, calling of the roll was followed by the report of Committees on Medical Education,Arrangement, Scientific Work, Public Health and Legislation and Publication Committee. also report of Treasurer, Secretary, and appointment of Nomination Committee. On Wednesday morning the Medical and Surgical Sections held their first meeting and commenced the discussion of papers. The idea of having the work of the association in sections has been demonstrated to be a success. It not only enabled the Committee on Scientific Work to present a large num-

ber of papers to be read and discussed, but enabled those gentlemen in attendance to spend their time in the section of special interest to them. The address of the President by Dr. D. C. Gore, address on Medicine by Dr. W. G. Moore, and address on Surgery by Dr. C. H. Wallace were delivered Wednesday evening at the general session. Jefferson City was decided upon as the next place of meeting and the decision was doubtless a wise one. The railroad facilities are good, hotel arrangements quite satisfactory and there was litle dissatisfaction expressed either as to the accommodations or their cost. The local profession entertained royally. The reception Monday evening, supper Tuesday evening at the Penitentiary reception later during the same evening at the Governor's mansion,and Wednesday evening a drive over the city to the park where luncheon was served, were all most enjoyable. However, in future the local profession should not be asked to carry the burden of entertainment, but the entire expense should be borne by the association.

BARRY COUNTY.

Since our last issue the Barry County Medical Society has been organized with the following officers and members: President, Dr. Wm. M. West; Vice-President, Dr. J. M. Russell; Secretary,-Treasurer, Dr.D. L. Mitchell; Delegates, Drs. D. E. Miller and A. S. Hawkins; Board of Censors, Drs. L. B. Northcut, R. B. Gladden, and M. R. Trumbower; Members, Drs. W. M. West, Monett; D. L. Mitchell, Cassville; J. M. Russell, Monett; A. S. Hawkins,Monett; L. B. Northcut, Washburn; R. B. Gladden, Monett; D. E. Miller,Monett; M. R. Trumbower, Monett.

ST. FRANCOIS COUNTY.

We have to report the organization during the past two weeks of the St. Francois County Medical Society with the following officers and members: President, Dr. J. L. Hou; Vice-President, Dr. L. A. Anthony, Secretary, Dr. A. L. Evans; Treasurer, Y. L. Haney; Delegate,Dr. F. L. Keith; Board of Censors, Drs. M. B. Barber, G. B. Perkins, H. M. Topping; Members: Drs. A. L. Evans, Bonneterre; F. L. Keith, Flat River; M. B. Barber, Flat River; G. B. Perkins, Elvins; A. Marshall, Bonneterre; C. P. Posten, Bonneterre; I. N. Shannon, Knob Lick; J.L. Hou, Farmington; L. A. Anthony, Bonneterre; T. L. Haney, Flat River; H. M. Topping, Flat River.

DENT COUNTY.

The latest addition to the list of Medical Societies was organized by Dr. R. L. Johnson, of Rolla, Councillor of the sixteenth district, with the following officers and members: President, Dr. A. F. McMurtrey; Secretary and Treasurer, Dr. J. C. Welch; Delegate, Dr. W. E. Rudd; Board of Censors, Drs. L. B. Craig, E. A. Duncan, W. E. Rudd; Members: Drs. A. F. McMurtrey, L. B. Craig, E. A. Duncan, W. P. Cummings, W. E. Rudd, J. C. Welch, of Salem; H. H. Brown, Condray; W. M. Leonix, Hobson; E. Y. Pare,Sligo; J. B. Gordon, Gila.

THE BOSTON MEETING.

The fifty-seventh Annual Session of the American Medical Association will be held in Boston on Tuesday, Wednesday, Thursday and Friday, July 5, 6, 7, 8, 1906. The Committee on Transportation announces reduced rates on all railroads for the Boston Session. From Missouri one fare, plus one dollar for the round trip. A number of distinguished medical men from abroad will address the different sections. Among others may be mentioned: Geo. Hofrat, Prof. von Rosthorn, Heidelberg, Germany; Prof. Dr. Duhrssen, Berlin, Germany; Dr. Wesley A. Mills, Montreal, Canada; Dr. Max von Frey, Physiologishes Institut, Wurzberg, Germany; Prof. Max Joseph, Berlin, Germany; Herr Geheimrat Prof. F. Trendelenburg, of Leipzig, Germany. A special train will be run over the Chicago and Alton, the Grand Trunk and the Boston and Maine Railroad, certain cars of which will leave Kansas City and St. Joe, May 31st. The afternoon of the first day will be spent in Chicago and the departure over the Grand Trunk will be at 4 P. M., on a special train, arriving at Boston, June 4th, morning. This trip includes a stop at Niagra Falls, a boat trip down the St. Lawrence river, through the Thousand Islands and runs through the famous Green Mountain scenery. This will be known as the Missouri Valley Special.

STATE ANOTOMICAL BOARD.

The Annual Meeting of the Missouri State Anatomical Board was held May 17th, at Jefferson City. Election of officers resulted as follows: President, Dr. C. M. Nicholson, St. Louis; Vice-President, Dr. Howard Hill, Kansas City; Secretary, Dr. J. M. Jackson, Columbia, Mo.; Treasurer, Dr. A. R. Keiffer, St. Louis. The next annual meeting will be held at Jefferson City.

UNTAXED ALCOHOL.

THE HOUSE COMMITTEE on Ways and Means decided, on March 30, by a vote of sixteen to two, to report favorably a bill abolishing the internal revenue taxes on "denaturized alcohol"—that is, alcohol made unfit for use as a beverage. Wood alcohol is already free, and the proposition is to take of the taxes from ordinary alcohol so prepared as to be fit for nothing but use in the arts. The hearing before the committee disclosed surprising industrial possibilities in this direction. The tax on alcohol is now $1.10 per proof gallon, which makes from $1.98 to $2.11 per gallon of the commercial article. Untaxed, the cost would be from fourteen to twenty cents per gallon. An acre of corn could be made to produce about one hundred and seventy gallons of commercial alcohol, of which one hundred gallons would be obtained from the stalks, which now go to waste. An acre of potatoes could yield five hundred gallons of alcohol. It is now possible to make a brilliant light from alcohol with an incandescent mantle, and if that alcohol were untaxed it would be cheaper in a large part of the country than kerosene. It would be a boon to the farmer, who would heat

and light his house and run the power plants of his farm with the waste products of his fields. It would furnish a substitute for the rapidly diminishing supply of gasoline for automobiles and motor boats.. It would run traction engines to replace horse-power in plowing and reaping. It would revolutionize dozens of manufacturing industries, while opening a new and unlimited home market to the farmer. It is no wonder that even a "stand pat" Congress seems inclined to try the experiment of removing taxes in this case. (*Colliers Weekly*).

Following is a list of members registered at the Jefferson City meeting:

Adcock, J. A. B.
Alexander, W. J.
Allder, A. Eugene
Allee, E. M.
Allee, G. D.
Allee, W. S.
Allen, F. W., Sr.
Allen, J. M.
Allen, T. C.
Allison, Nathaniel
Amerland, J. H.
Anderson, Jas. I.
Anderson, John
Anthony, F. R.
Atkins, Calvin
Austin, M. B.
Babler, E. A.
Bailey, W. S.
Baker, N. F.
Baker, J. H. T.
Barclay, Robert
Barger, J. N.
Bartlett, Willard
Bayliss, W. M.
Baysinger, S. L.
Bedford, S. V.
Beedle, Gordon A.
Bell, W. E.
Bell, W. T.
Berrey, R. W.
Bingham, J. W.
Blakesley, T. S.
Bogart, T. N.
Bonham, V. Q.
Booth, D. S.
Boulware, T. C.
Bowline, B. F.
Braecklein, W. A.
Bramel, H. W.
Briegleb, C. F.
Broome, G. Wiley
Brown, A. C.
Brown, John E.
Brown, S. M.
Brown, Tinsley
Buchanan, J. Robert
Buckwalter, J. C.
Buren, Chas. R.
Burke, Jno. P.
Cadwallader, I. H.
Cadwell, Victor
Callaway, L. H.
Campbell, A. J.
Campbell, O. Beverly
Cave, E. S.
Chapman, A. W.
Chastain, C. H.
Chastain, M. T.
Chastain, O. N.
Child, Scott P.
Chowning, Thos.
Christian, C. H.
Clark, W. A.
Cline, W.
Clopton, M. B.
Cochran, O. W.

Coffey, W. H.
Coil, Paul E.
Cole, H. B.
Colson, J. R.
Cook, F. L.
Cook, T. B.
Craig, T. B. M.
Crawford, R. O.
Cross, R. O.
Crossen, H. S.
Crowson, Egbert
Crowson, E. L.
Crum, J. A.
Dallas, L. W.
Dalton, H. C.
Davis, J. R.
Davis, S. O.
Davis, T. O.
Dawson, J. W.
Dearing, W. A.
DeVilbiss, E. F.
DeVilbiss, Frank
Dixon, C. H.
Dorsett, Walter B.
Downing, T. J.
Drake, N. A.
Dunaway, L. T.
Elam, W. T.
Ellis, Frank B.
Enloe, C.
Enloe, I. N.
Ettmueller, Gustav
Evans, R. L.
Farrington, O. P.
Fassett, Chas. Wood
Ferguson, A. D.
Ferguson, W. J.
Frankenburger, J. M.
Frick, W. J.
Fulton, A. L.
Fulton, F. H.
Freudenberger, H. C.
Funkhouser, Robt. M.
Geiger, Chas. G.
Geiger, Jacob
Gleaves, O. G.
Goldman, Max
Goodier, Robt. H.
Goodson, H. C.
Goodwin, E. J.
Gore, D. C.
Gosney, C. W.
Graham, J. K.
Gray, A. L.
Graves, Wm. W.
Green, John, Jr.
Greene-Wilson, Dora
Greeson, G. A.
Griffin, J. M.
Griffith, J. D.
Grindon, Joseph
Gum, P. D.
Gunn, A.J.
Haire, Robt. D.
Hale, Jos. M.
Hall, C. Lester
Hall, Frank J.
Hall, T. B.
Hamel, A. H.
Hamel, Geo. F.
Hamlin, C. W.
Hampton, J. R.
Harris, James A.
Harris, J. E.
Harrison, J. F.
Hatter, W. L.
Hawkins, G. W.
Heckman, S. P.
Heddens, J. W.
Henderson, F. L.
Hendrix, M. B.
Hertzler, A. E.
Hill, Jas. A.
Hill, Roland
Homan, George
Hopkins, Thos. A.
Hough, C. P.
Howard, F. A.
Hughes, Marc. R.
Hypes, B. M.

Inglish, J. E.
Jackson, C. M.
Jackson, Jabez N.
Jensen, N. N.
Jerard, H.
Jeude, Julius J.
Johnson, E. W.
Johnson, R. L.
Johnson, Wm. E.
Jones, A. L.
Jones, W. G.
Jurgens, H.
Kelso, R. S.
Kennedy, J. J.
Kennedy, W. U.
Kenney, W. L.
Kepner, Jno. W.
Kieffer, A. R.
King, Geo. A.
Kouns, D. H.
Kuhn, Wm. F.
Lamkin, W. M.
Lanier, L. H.
Latham, H. W.
Latham, L. L.
Leach, H. T.
Leonard, P. I.
Lichtenberg, J. S.
Lightfoot, Frank
Lockwood, T. F.
Loeb, H. W.
Logan, James E.
Long, J. M.
Lopp, J. E.
Lowrey, E.
Loyd, T. B.
Lutman, H. N.
Lutz, F. J.
McAlester, A. W.
McAlester, A. W., Jr.
McCandless, W. A.
McComb, J. A.
McComb, J. L.
McDonald, H. A.
McGuire, M. S.
McKinley, W. E.
McLemore, T.
McMurry, M. C.
McNutt, W. B. A.
Mann, A. W.
Mann, F. W.
Manning, D. F.
Mark, E. G.
Martin, J. B.
Matthews, J. C.
Meredith, A. L.
Meyer, L. A. T.
Milam, B. J.
Miller, E. H.
Miller, E. M.
Millican, Kenneth, W.
Mills, O. P. M.
Mills, S.
Mitchell, C. A.
Mitchell, Wm. F.
Monroe, A. E.
Moore, Geo. M.
Moore, J. W.
Moore, Roy D.
Moore, Wm. G.
Morfit, J. C.
Morrow, W. F.
Morton, Daniel
Mosby, C. V.
Moss, Woodson
Murphy, Franklin E.
Murray, L. F.
Musson, E. H.
Myer, Jesse S.
Neff, Robt. L.
Nicholson, C. M.
Nifong, Frank G.
Norman, J. B.
Norwine, J. J.
Norwood, W. W.
Orrick, G. W.
Orr, Chas. J.
Overholser, M. P.
Owens, J. H.
Patterson, W. R.
Pearse, H. E.
Pipkin, W. D.

Pitman, J.
Pitts, Barton
Platter, A. E.
Porter, D. R.
Porter, Wm.
Porterfield, E. P.
Porth, J. P.
Potts, Jerome D.
Prentiss, H. S.
Punton, John
Ramey, R. D.
Rea, Robt. W.
Redman, Spence
Reid, H. L.
Reynolds, A. C.
Reynolds, E. M.
Reynolds, S. H.
Rigdon, Thos. J.
Roberts, C. F.
Robinson, J. F.
Robinson, John L.
Rodes, N. R.
Rogers, J. C.
Roseberry, E. C.
Rowell, H.
Rudd, W. E.
Ryland, C. T.
Sampson, J. H.
Sands, M. L.
Seba, John D.
Seybold, Ira W.
Schauffler, R. McE
Scherck, H. J.
Schlueter, Robt. E.
Schmid, W. F.
Schneider, J. A.
Schutz, Robt.
Schutz, W. H.
Shelton, C. W.
Shy, M. P.
Smith, Jas. W.
Son, E. R.
Songer, H. E.
Soper, H. W.
Stauffer, W. H.
Stone, A. B.
Stratton, C. D.
Stuart, James
Talbott, Hudson,
Tanner, W. C.
Teel, S. M.
Thompson, W. S.
Thorpe, Alonzo V.
Thorpe, J. L.
Thrailkill, E. H.
Tiffany, Flavel B.
Todd, L. A.
Todd, T. B.
Townsend, W. H.
Triplett, J. S.
Trippeer, Bert
Tucker, A. J.
Tupper, Paul Y.
Vandivert, A. H.
Van Hoefen, S. A.
Van Ravenswaay, C. H.
Vonspecht, J. A.
Wallace, C. H.
Wallace, W. S.
Walter, F.
Walton, J. H.
Warfield, Louis M.
Webb, W. C.
Welch, J. F.
Welch, W. A.
Well, Wm.
White, J. A.
Whittington, Wm.L.
Williams, D. B.
Williams, P. E.
Williams, V. A.
Winningham, W. H.
Wilson, G. S.
Witherspoon, T. C.
Wood, E. A.
Wood, N. P.
Woodson, C. R.
Wright, U. S.
Yates, Martin
Zellman, A. W.
Zwart, B. H.

COUNTY SOCIETY NOTES

BARTON COUNTY MEDICAL SOCIETY.

The regular quarterly meeting was held at Liberal on February 8th. Drs. C. A. Smith, J. S. Gish and J. W. Clark, of Liberal, were elected to membership. Dr. R. J. Fletcher was elected an honorary member.

Dr. A. van Meter read a paper on "Incipient Bright's Disease." Dr. Allee read a paper entitled "Arthritis". Dr. J. K.Cole presented a paper entitled "Incipient Delirium Tremens," and Dr. W. A. McKelvey chose the subject of "Gonorrhoeal Rheumatism."

A vote of thanks was tendered the physicians of Liberal for the generous entertainment prepared for the members of the society.

J. L. McComb, Secretary.

HARRISON COUNTY MEDICAL SOCIETY.

The quarterly meeting was held at Bethany on April 17th. Dr. Jacob Geiger, of St. Joseph, read a paper on "Peritonitis". Dr. J. H. Morrow read a paper entitled "Liberty Considered in a Reflective Mood". Dr. Eades reported a case of traumatic injury to the lumbar region.

The next meeting will be held at Bethany on July 17th at which time officers for the year will be elected.

W. H. Wiley, Secretary.

NODAWAY COUNTY MEDICAL SOCIETY.

At the regular meeting held May 8th papers were read as follows: "The Minister and the Doctor", by Rev. Homer M. Cook; "The Lawyer and the Doctor," by Hon. John M. Dawson; "The Editor and the Doctor," by Hon. Chas. J. Calden; "The Pharmacist and the Doctor", by Mr. E. G. O'Rear.

Dr. L. E. Dean reported a case of fissure of the tongue, and Dr. Howell reported a case of cystitis.

The following committee were appointed: Arrangements, Drs. H. L. Sayler, W. P. Stuckle and H. C. Goodson. Legislative, Drs. Geo. Nash, R. M. Brandenberger and E. L. Crowson. Entertainment, Drs. L. E. Dean, Chas. Ellis, J. H. Todd.

The following applicants were elected to membership: Drs. Egbert Crowson, Gaynor City; John Gomer, Wilcox; E. T. Molyalm, Ravenwood; D. G. Smith, Arkoe; J. B. Robinson, Quitman.

An amendment to the by-laws was adopted making the meeting held in January the annual meeting at which time officers for the year shall be elected.

H. L. Sayler, Reporter.

PLATTE COUNTY MEDICAL SOCIETY.

At the regular monthly meeting held May 2nd in Platte City, the subject of "Valvular Lesions of the Heart" was taken up for general discussion. This was followed by an informal discussion of "Antirheumatics".

Resolutions were adopted requiring that a uniform fee of $5.00

be charged for making examinations of applicants for life insurance.

The next meeting will be held on the first Wednesday in June.

G. C. Coffey, Reporter.

ST. GENEVIEVE COUNTY MEDICAL SOCIETY.

At the regular monthly meeting held May 9th, Dr. Rutledge addressed the Society on the subject of Sanitation as Affecting the Prevalence of Typhoid Fever. He also reported two fatal cases of typhoid fever.

On motion Dr. M. Andre, ex-president of the society, was elected honorary member.

The next meeting will be held on the second Wednesday in June, at 8:30 a. m.

R. W. Lanning, M.D., Secretary.

CASS COUNTY MEDICAL SOCIETY.

The bi-monthly meeting was held at Harrisonville on May 3rd. Interest in the meetings is growing steadily and the attendance of members is increasing. Our president, Dr. Farrell, has not missed a meeting and the three members of the board of censors always in their places.

Our county representative, the Hon. W. P. Houston, was present at this meeting and gave a most interesting talk on the subject of medical legislation. He pointed out the absolute necessity of presenting a bill at the beginning of the session, having it introduced in both branches of the Assembly simultaneously, and having delegates on the spot if we desired to see the bills which may be introduced become laws. He said he recognized the chaotic condition which caused medical legislation to go floundering about and pledged his support of measures looking to the betterment of the practice of medicine in Missouri and for the punishment of shameless medical quacks.

A vote of thanks was tendered Mr. Houston for his interest and promise of co-operation.

Dr. Ed. Schoor read a paper on "Primary Suturing of the Cervix." This was one of the best paper that has been read before this society. The discussion following the reading of this paper was full of interesting suggestions and compliments to the author.

At the July meeting the subject of a fee bill will come up for discussion.

Drs. Wm. Beckman of Strasburg and R. P. Yeagle of Pleasant Hill were elected to membership.

W. F. Chaffin, M. D., Reporter.

CLINTON COUNTY MEDICAL SOCIETY.

The society met in Plattsburg on May 1st with a fair attendance of the members. Dr. G. B. Rush reported tre case of a patientwho had suffered for some time with severe dysmenorrhea supposed to have been due to vaginal stenosis. The condition did not seem to improve under treatment. The patient did not seem to improve under treatment died in a short time from pulmonary tuberculosis.

At the next meeting, June 5th,

Dr. G. B. Rush will read a paper on "Opium" and E. A. Colley will read a paper on "Choice of an Anesthetic".

The next meeting will be held in Plattsburg.

E. A. Colley, M. D., Secretary.

COOPER COUNTY MEDICAL SOCIETY.

The regular monthly session convened in Boonville on May 1st. Ten members were present.

Clinical cases were presented by Drs. Hurt, Smith, Taylor, Allee, Cochran and Lionberger. The cases and the discussion following proved full of interest and benefit to all.

The subject of a joint meeting of the Boone, Howard and Cooper county societies was considered and the secretary was instructed to write to the secretaries of Boone and Howard counties, inviting them to meet with the Cooper County at Chouteau Springs, Cooper County, on June 20. Dr. R. E. Fogle of Clifton City, was elected to membership.

The next meeting will be held on the first Tuesday in June.

John R. Lionberger, M. D.,
Secretary.

DAVIESS COUNTY MEDICAL SOCIETY.

The attendance at the meeting in Gallatin, on May 8th, was rather small but interest was not lacking. Dr. Wetzel of Jameson, read a paper on "Dysentery" which was freely discussed.

A clinical case of cancer of the breast was presented by Dr. Minick of Lock Springs.

Dr. Frazier of Gallatin presented a case of phlegmonous erysipelas.

Dr. Smith was instructed by the society to investigate how we can get at the traveling quacks who travel over the country and fake the people.

Dr. Cox of Winston and Dr. Martin of Jameson were elected to membership.

The next meeting will be held on August 14th.

H. E. Songer, M. D., Reporter.

GASCONADE-MARIES-OSAGE COUNTY MEDICAL SOCIETY.

The Gasconade-Maries-Osage County Medical society met at Belle on April 26th. Eight members and five visitors were present.

The following applications for membership were received: Drs. O. C. Fritts, S. J. Terrell and Chas. T. Leach. Upon motion the rules were suspended and the ballot taken resulting in their election.

Drs. J. W. Burgess and O. C. Fritts each presented a patient. It was then moved to adjourn until 7:30 p. m.

At the evening session Drs. J. J. Ferrel, J. W. Burgess and Jno. Engelbrecht presented patients. Dr. W. E. Seba read a paper entitled "The Value of Vital and Mortuary Statistics and How They Should be Taken." Discussed by Dr. J. D. Seba.

Dr. J. D. Seba read a paper entitled "Surgical Intervention in Cerebral Apoplexy, With the Re-

port of a Case". Discussion by Drs. W. R. Ferrel, Engelbrecht, W. E. Seba, Spurgeon and Nieweg.

Dr. J. J. Ferrell reported "The History of a Case of Appendicitis".

The next meeting will be held at Meta.

J. W. Nieweg, M. D., Secretary.

GRUNDY COUNTY MEDICAL SOCIETY.

The regular meeting was held in Trenton, on Tuesday, May 15th. This being the annual meeting, officers and committee made reports.

Dr. Winnigham presented a case of Carbuncle.

The election of officers resulted as follows: President, W. H. Addington, Spickards; vice-president, C. L. Webster, Trenton; secretary and treasurer, D. W. Coon, Trenton.

The retiring president made appropriate remarks for the betterment of the society and the medical profession in general. The newly elected president assured the society that he appreciated the honor of being elected president, and that he would always be found working for the betterment of the profession in general as well as the Grundy County Medical Society in particular.

The following committees were appointed: Committee on Medical Jurisprudence, Drs. Winningham, Wright and Sheldon; Committee on Arrangements, Drs. Asher, Fulkerson and N. E. Sutton; Committee on Scientific Communications, Drs. Davenport, G. A. Moore and Pitman; Committee on Medical Education, Drs. Bertha Sutton, Allen and T. E. Moore.

On motion the following resolutions were adopted and the secretary instructed to notify all members of said action: That the members of the Grundy County Medical Society refuse to practice with or consult with any osteopathic physician, or *with any other physician who does consult or practice with any osteopathic physician*, under penalty of reprimand for the first offense and expulsion from the society for a second offense.

The next meeting will be held at Spickards on June 19th.

D. W. Coon, M. D., Secretary.

HOWARD COUNTY MEDICAL SOCIETY.

At the meeting held in Fayette on May 4th, Dr. Moore presented a very interesting case of abdominal tumor, the probable diagnosis being cancer of the pancreas. Dr. Fleet presented a case of pruritis ani.

C. W. Watts, M. D., Reporter.

KNOX COUNTY MEDICAL SOCIETY.

The regular meeting was held at Edina on May 7th. This meeting was the best one in the history of the society. Eight members were present and interest in the affairs of our county society seems to be constantly growing deeper and the members are becoming more enthusiastic.

Dr. H. F. O'Connor, of Baring, and Dr. R. E. Wilson, of Labelle, were elected members. Dr. J. R. Northcutt was chosen to represent this society at the meeting of the

North Missouri Medical Society at Moberly, and also to prepare a paper for that meeting.

Steps were taken to collect funds for the relief of physicians who suffered losses in the San Francisco disaster.

Dr. J. R. Northcutt read a paper entitled "The Management of Normal Labor and the Puerperium." The following members were appointed to read papers at the next meeting: Drs. F. E. Luman, R. E. Wilson, H. H. St. John, James Myers.

The next meeting will be held on the first Monday in July.

H. JURGENS, M.D., Sec.

NEWTON COUNTY MEDICAL SOCIETY.

Twelve members attended the meeting at Neosho, on May 8th. Interest in the meeting is growing steadily and we feel that much good is being derived by the members from their association in the county society. At this meeting Dr. W. A. Craven of Granby read a paper on "Scarlet Fever," and Dr. H. M. Mixer of Neosho read a paper on "Infant Mortality and Feeding." Dr. Mixer's paper is of such practical value that we hope it may appear in the State Journal.

HORACE BOWERS, M.D., Secy.

SHELBY COUNTY MEDICAL SOCIETY.

Pursuant to call, the Shelby County Medical Society met on April 20th. The subject of pneumonia was taken up for discussion, with special reference to large doses of quinine as one of the salient features of treatment.

The question of preventing illegitimate traveling advertising doctors was discussed, the penalty not seeming to be sufficient to stop this practice. No definite action was taken.

H. C. VAUGHAN, M.D., Secy. Pro Tem.

ST. LOUIS MEDICAL SOCIETY.

MEETING OF APRIL 21ST.

At this meeting the subject of criminal abortion was considered The medical standpoint was presented by Dr. John M. Grant, the moral and religious aspects by the Rev. Jas. Sullivan, and Asst. Circuit Attorney Geo. N. Fickiessen discoursed on the legal phase. A very general discussion of the subject followed the reading of these papers. On motion a vote of thanks was tendered the essayists and those taking part in the discussion.

The committee on public health and legislation reported on the work that has been done and outlined the probable results of the crusade against advertising quacks, obscene medical advertisements, medical corporations, abortionists, etc.

Dr. M. W. Hoge presented a case of paralysis of the lower limbs due to fracture of the vertebrae.

The committee on elections reported favorably upon the following candidates and they were duly elected to membership: Jerome E. Cook, H. Robert Davis, Louis L. Guggenheim, Jacob A. Hartman, L. H. Hempelmann, W. C. Owen, M.

E. Poland, E. L. Sheahan, Robert J. Terry. Attendance: 153.

MEETING OF APRIL 28TH.

Dr. C. A. Weinsberg, 1531 S. 11th St., was elected associate member. Dr. O. L. Suggett read a paper entitled "The Possibilities of the Spirochaeta Pallida". Drs. Phillips, Fisch, Laidley and McConnell spoke on the subject in the discussion.

Dr. W. C. G. Kirchner presented a paper in which he described a case of pancreatitis relieved by operation.

Discussion on the subject of criminal abortion was renewed and the following members took part: Drs. Dorsett, Laidley, Scherck, Kieffer, Behrens, Boisliniere, Forster, Fleming, Bryan and Grant.

Attendance. 77.

MEETING OF MAY 5TH.

The committee appointed to collect funds for the relief of the physicians in San Francisco reported that over $800 dollars had been collected.

Dr. Geo. Gellhorn read a paper entitled "Dry Heat as a Factor in Gynecology". He also demonstrated a new apparatus for making the application. The paper was discussed by Drs. Shattinger, Blair and Ehrenfest.

Dr. L. T. Riesmeyer read a paper being a report of a case of hematosalpinx with rupture into the peritoneal cavity. He also presented a specimen of ovarian cystoma. Discussion by Drs. Dorsett and Kieffer.

MEETING OF MAY 12TH.

Dr. Jesse S. Myer read a paper on "Congenital Pyloric Stenosis". Discussion by Drs. Green, Warfield, Bles, Johnson, Martin, Sharp, and Barclay.

Dr. W. C. G. Kirchner reported a case of gastrectomy and presented the patient. Discussion by Drs. Kieffer and Moore.

Dr. L. M. Warfield read a paper on the "Origin of Renal Casts;" Diagnostic Significance and Value". A number of the members took part in the discussion.

MEETING OF MAY 19TH.

Dr. F. L. Henderson reported a case of hysterical binocular amaurosis.

The delegates to the annual meeting of the state medical association reported on the work done at the meeting in Jefferson City.

I. E. GRAHAM, M. D., Reporter.

ST. LOUIS COUNTY MEDICAL SOCIETY.

MEETING OF APRIL 11TH

Dr. W. B. Dorsett, district counsellor, attended this meeting and delivered an interesting and instructive lecture on "Extra Uterine Pregnancy and Diagnosis of Fetal Position." A vote of thanks was extended to him.

Dr. Dunnavant presented a case of Valvular Lesion of the Heart.

MEETING OF MAY 9TH.

The secretary read a communication from the relief committee of the American Medical Association appealing for donations and contributions to the fund being raised for the relief of the stricken physicians of San Francisco. An appropriation of $20.00 was authorized to be paid

from the general fund of this society.

Dr. M. W. Clair, of Ballwin, and Dr. R. W. Mills of Webster were elected members. Dr. John Pitman gave an interesting talk upon injuries of the head.

R. D. Moore, M.D. Reporter.

BOOK REVIEWS

Topography of the Thorax and Abdomen, by Peter Potter, A.M.,M. D., Associate Professor of Anatomy of the St. Louis University, sometime Instructor in Anatomy University of Missouri. Published by the University of Missouri. $1.75.

The object of this volume is to give in detail some observations upon the interrelations of the organs as found in a single body. For this purpose a body has been studied by the method of sections with reference to the more important thoracic and abdominal organs and systems which are described individually, giving in each case the topography of the part, its relation to the surrounding structures, and a comparison with the literature of the subject.

The sections upon which the observations of this work are based were from the body of a well developed adult with no external signs of abnormal or pathological conditions. The trunk was cut into twenty-five cross-sections. As each section was made the loose pieces and parts liable to be displaced were stitched in place with needle and thread. While every part was yet in its normal position, a drawing was made of each section by placing a thin plate of glass on its upper surface and tracing the outline of the parts with a fine pen and India ink. This tracing was then transferred to paper by placing the sheet on the glass over the drawing, holding them up to the light and retracing the outline on the paper. The parts in each drawing are carefully lettered and named. The nomenclature adopted by the German Anatomical Society at its meeting in Basel, 1895, (B. N. A.) is used. Besides the twenty-five plates representing the twenty-five sections there are ten additional plates in colors showing the relation of the organs as projected on the lateral surfaces of the body, also projections of the various internal organs upon the surface of the body reduced to one-half life-size. The work is prefaced with an interesting resume of the work done on this subject by various anatomists from the time of Vesalius (1555) to the present day. To the students of anatomy the observations set forth in this volume are intensely interesting; it is the most replete of its kind, and is the result of years of hard study, close observation and careful dissection.

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